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ACUTE CORONARY INSUFFICIENCY

Its Importance in Military Medicine

ARTHUR M. MASTER, *M. D.*
HARRY L. JAFFE, *M. D.*
LEONARD E. FIELD, *M. D.*

ACUTE coronary insufficiency is of interest in military medicine, as in civilian practice, since military life exposes men to situations and conditions capable of inducing coronary insufficiency. This condition arises whenever the coronary circulation becomes inadequate for the needs of the myocardium at the moment. Its occurrence is not limited to older people but also is common in the young. The prevalence of coronary disease is indicated by the mortality statistics. In 1952 it was recorded as causing 325,135 deaths in this country, independent of hypertension and other heart diseases.[1] Thus, it was listed as the cause of more than 60 per cent of all cardiac deaths. As a matter of fact, coronary disease accounts for over 80 per cent of cardiovascular deaths, inasmuch as it is probably the cause of death in the majority of patients with hypertension and in many of those listed as "other myocardial degeneration," "acute myocarditis not specific as rheumatic," et cetera.[1] Postmortem studies indicate that significant coronary disease is present in one out of two apparently healthy men between 36 and 46.[2] We estimated that over 1,000,000 new attacks of coronary occlusion occur annually in this country.[3]

These figures hold for all age groups, but it has become increasingly evident that coronary disease, far from being limited to the older age levels, is common in young men. The diagnosis of coronary occlusion is now commonplace in men in their 30's, and it is being detected even in those in their 20's.[4-16] Enos and his associates[15] found significant narrowing of the coronary

From Mount Sinai Hospital, New York, N. Y. The authors were on active duty during World War II as Capt. A. M. Master (MC) USNR, Lt. Comdr. H. L. Jaffe (MC) USNR, and Maj. L. E. Field, MC, AUS.

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arteries, *i. e.*, 50 per cent to almost complete occlusion, in 15.3 per cent of men killed in action in Korea between the ages of 18 and 48. They reported lesser evidence of gross coronary disease in an additional 62 per cent. Country[16] recently reported 14 cases of acute coronary thrombosis in airmen between the ages of 23 and 35. The most dramatic data demonstrating this fact are obtained in numerous studies during World War II and the Korean episode.[5–16] In fact, Yater and his associates[14] collected 866 cases in patients under the age of 40.

DEFINITION

There is considerable confusion in the medical literature concerning the meaning of the term coronary insufficiency. Although its effect on the myocardium may be permanent, it usually refers to a transitory and reversible insufficiency of coronary flow. The attack may be induced by obvious conditions or factors capable of inducing coronary insufficiency or may occur spontaneously without an obvious precipitating cause. In the latter case, the attack may at first be indistinguishable from the premonitory phase of coronary occlusion with major infarction.[17,18]

Acute coronary insufficiency includes a variegated group of attacks more prolonged and severe than simple anginal episodes, but without the typical signs of major infarction and the characteristic electrocardiographic pattern of coronary occlusion.[19,23] In mild attacks of acute coronary insufficiency the electrocardiogram may show no change, but usually RS-T depression and/or T-wave inversion appear (fig. 1). It is transitory in mild cases but persists for several days or weeks in more severe cases. Clinically, no evidence of myocardial necrosis or infarction may appear, or mild fever, leukocytosis, and acceleration of the sedimentation rate may be present, indicating some degree of necrosis. The postmortem material available reveals subendocardial necrosis without acute coronary occlusion.[13] This localization accounts for the type of electrocardiographic change found.

A word is required to define angina pectoris or the anginal syndrome. It is true that each brief episode of pain, almost always precipitated by effort, emotion, et cetera, and quickly relieved by nitroglycerin, represents a transitory state of coronary insufficiency with ischemia. However, we prefer to reserve the term acute coronary insufficiency for more prolonged attacks.

DIFFERENTIAL DIAGNOSIS

In contradistinction to acute coronary insufficiency, acute coronary occlusion, in which there is complete, relatively rapid obstruction of the vessel with through-and-through infarction, presents a characteristic electrocardiographic pattern of RS-T elevation and deep Q waves (fig. 2). The attack occurs spontaneously

Figure 1. A 60-year-old woman developed acute coronary insufficiency 2 days after an operation for carcinoma of the colon. The patient was in shock (blood pressure, 50/20 mm. Hg) at the time tracing A was made. The hemoglobin was 9.5 grams per 100 ml. Mild chest pain was present. The electrocardiogram shows tachycardia with marked RS-T depression. (B) Same day, following recovery from shock. RS-T depressions now minimal. The patient died 3 days later. Autopsy revealed subendocardial hemorrhages; hemoperitoneum; thrombosis, left hepatic artery.

and may be attended by shock, congestive failure, marked drop in blood pressure, and arrhythmias. The electrocardiogram exhibits permanent changes in 90 per cent of patients.[24]

There are infrequent exceptions to the criteria just given for differentiating acute coronary occlusion and acute coronary insufficiency and it is not always possible to decide in each case when first seen, into which of these it will prove to fall. Also, the clinical and postmortem findings are not always correlated. For example, acute coronary occlusion occasionally occurs without producing a major infarct; in some instances the course may be very mild and, finally, very rarely only inverted T waves may appear in the usual 12-lead electrocardiogram. Vice versa, in coronary insufficiency, massive, through-and-through infarction on rare occasion occurs without an acute occlusion, at times producing RS-T elevation and/or Q waves in the electrocardiogram. These changes may occasionally be seen briefly in clinical attacks.[25]

For these reasons, some authors have discarded the term coronary occlusion, grouping acute coronary attacks merely into those *without* and those *with* myocardial necrosis or infarction, regardless of the type of electrocardiogram present or whether acute coronary occlusion is present or not. For the attacks without evidence of infarction, a number of terms have been proposed, *e. g.*, coronary failure,[26] slight coronary attacks, acute atypical coronary artery insufficiency,[27] and intermediate coronary syndrome. Although all of these designations have some specific validity, it has been our experience that the terminology outlined above has proved to be practical and of clinical value. Acute coronary occlusion and acute coronary insufficiency can be differentiated electrocardiographically in at least 90 per cent of cases.[21] We do not think that it is of value to use the term coronary insufficiency in the widest general sense to include all coronary attacks, as has been suggested. The term coronary insufficiency serves a useful purpose, particularly in those cases of acute coronary insufficiency induced by precipitating factors such as those enumerated later; here a distinct clinical, electrocardiographic entity is presented which lends itself to prophylaxis and treatment. Also, it is useful to separate spontaneous attacks of coronary insufficiency, even when attended by subendocardial necrosis, from coronary occlusion with extensive infarction, because of their usually benign prognosis and, therefore, the lesser need for prolonged or intensive treatment. For example, in acute coronary insufficiency anticoagulant therapy is not required since peripheral emboli do not occur and the period of rest is relatively short.[24]

We should like to repeat that the use of the term myocardial infarction, regardless of the type of electrocardiogram present,

or whether it is caused by coronary occlusion or insufficiency, appears to be inadequate to describe the different types and degree of infarction. If the term myocardial infarction is used as the primary diagnosis, it should be qualified as myocardial infarction secondary to coronary occlusion or to coronary insufficiency. We have adopted this procedure in respect to acute coronary insufficiency, *e. g.*, we divide the latter into spontaneous coronary insufficiency and coronary insufficiency secondary to effort, emotion, hemorrhage, tachycardia, or other factors. Also, we refer to coronary insufficiency with ischemia or with necrosis.

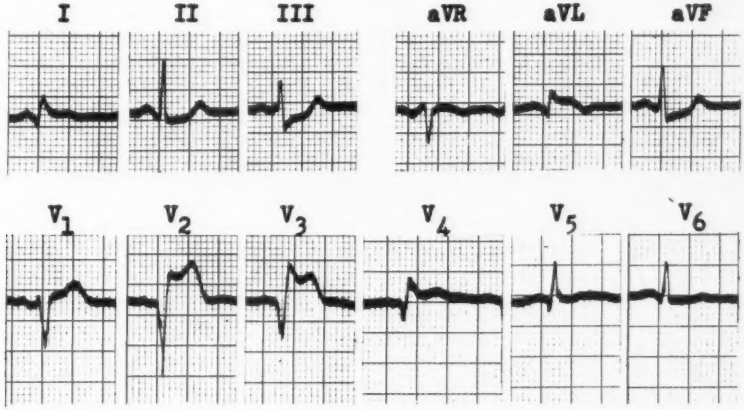

Figure 2. Acute coronary occlusion, second day. Anteroseptal infarction with characteristic changes in lead aVL.

INCIDENCE

It is difficult to make any estimate of the incidence of acute coronary insufficiency because many mild attacks are undetected and many more are diagnosed as coronary thrombosis. Yet sufficient data are available to make it evident that this condition is very common and is the usual cause of sudden death. Thus, Levy and Bruenn[28] found no evidence of coronary occlusion in 337 of 376 fatal cases of acute coronary disease, and Kroetz[29] reported 45 per cent without coronary occlusion. Hallermann[30] found that 79 per cent of sudden deaths in a series of coroner's cases were caused by coronary sclerosis without thrombosis. French and Dock[8] reported that in 51 of 80 cases of sudden death from coronary disease in young soldiers, there was no evidence of occlusion. Newman[31] stated that postmortem examination in 39 patients who died of coronary disease revealed 29 to be free of thrombus in the vessels. Moritz and Zamcheck[11] found that there was no coronary occlusion in three fourths of 300 cases of sudden death caused by coronary sclerosis in young soldiers.

In another investigation of sudden cardiac deaths Munck[32] found coronary sclerosis without thrombosis in 255 of 396 patients. Poe[12] failed to find evidence of coronary occlusion in five of nine fatal cases of coronary disease in young men. Master, Carroll, and Andrews[7] found a similar incidence in a naval hospital. In a detailed report of 450 autopsies in men 18 to 39 years of age who died of coronary disease, Yater and his co-workers[14] discovered a thrombotic occlusion in only 229, that is, about 50 per cent. Similar findings were reported by Spain and associates.[2]

In the last 1,000 consecutive, office, private cardiac consultations by the senior author of the present article, episodes of acute coronary insufficiency were diagnosed in 91 patients, or almost 16 per cent of the 567 patients with coronary disease (table 1). It is our impression that its actual incidence is considerably higher; this would appear in our figures if home consultations were included.

TABLE 1. *Diagnosis in 1,000 consecutive office cardiac consultations**

Organic	704	
Coronary disease, chronic		258
Coronary occlusion, acute		218
Coronary insufficiency, acute		91
Chronic rheumatic cardiac valvular disease		66
Hypertension		32
Chronic cardiac valvular disease (nonrheumatic)		26
Congenital		8
Pericarditis		4
Subacute bacterial endocarditis		1
Functional	296	

*These represent the primary diagnoses. The order of preference was (1) coronary occlusion, (2) coronary insufficiency, (3) coronary disease, et cetera. Hypertension was present in 253 additional cases.

It is thus evident that acute coronary insufficiency is a common disease in all age levels.

ETIOLOGY

As stated before, acute coronary insufficiency may be induced by conditions rendering the coronary circulation inadequate for the specific requirements of the myocardium.

The *precipitating* factors may be divided into three groups: (1) those increasing the work of the heart, such as effort, excitement, a large meal, sudden rise in blood pressure, fever, acute infections, gastroenteritis, hyperthyroidism, excessive smoking,

acute abdominal conditions, marked changes in temperature; (2) those decreasing the coronary flow, such as shock, hemorrhage, tachycardia, trauma, pulmonary embolism; (3) those altering the composition of the blood such as anemia, carbon monoxide poisoning, excessive altitude. As a matter of fact, in the majority of patients several of these factors are present.

Table 2 lists the activity at the onset of 200 attacks of acute coronary insufficiency studied. It will be seen that two thirds of the attacks began without known precipitating cause. In the remainder, acute hemorrhage, pulmonary embolism, effort, tachycardia, and surgical procedures were the most common exciting conditions. These figures indicate that acute coronary insufficiency usually occurs spontaneously.

TABLE 2. *Activity at onset of coronary insufficiency (200 attacks)*

Spontaneous	132	Trauma	1
Hemorrhage	12	Acute cholecystitis	1
Pulmonary embolism	10	Acute pancreatitis	1
Unusual effort	9	Gastroenteritis	1
Tachycardia	7	Hypertensive crisis	1
Surgical procedures	7	Postsympathectomy	1
Meals	6	Carbon monoxide	1
Excitement	4	Tobacco and alcohol	1
Asthma	2	Addisonian crisis	1
Acute heart failure	2		

In their cases, Yater and associates[14] found no correlation between the type of activity at the onset of the acute coronary attack and the type of pathologic change in the coronary arteries.

In military service, trauma, shock, acute hemorrhage, and strenuous exertion are apt to be frequent occurrences. Sudden immersion in cold water may occur in naval personnel, and a sudden lack of oxygen in flyers who bail out at high altitudes or whose pressurized cabin is pierced. Acute coronary insufficiency has been reported to occur following sudden excitement, for example, hearing of a death or a heated argument, and activities such as going through an obstacle course, participating in a battle indoctrination course, rescuing a drowning man, crawling through an infiltration course, drilling, pushing a car, flying, participating in a shakedown cruise on a warship, marching, or using an exercise machine. A combination of a heavy meal, smoking, and drinking not uncommonly brings on coronary insufficiency.

The importance of acute hemorrhage in inducing acute coronary insufficiency has been demonstrated by us.[33, 34] Acute hemorrhage induced fairly severe coronary insufficiency in 4 of 25 patients who came to autopsy.[35] In a group of 103 patients ranging from

18 to 79 years of age, all of whom had had varying degrees of hemorrhage, 57 per cent presented clinical or electrocardiographic evidence of acute coronary insufficiency.[34] Shock, tachycardia, fall in blood pressure, and decrease in blood volume were all important factors in the mechanism involved. Anoxemia due to decreased hemoglobin was also important, although the principal factor seemed to be the rapidity of blood loss. It is noteworthy that of the four patients in whom myocardial changes secondary to coronary insufficiency were found at autopsy, two had normally patent coronary arteries, one showed moderate coronary sclerosis, and one severe coronary disease. Thus, coronary insufficiency with necrosis may occur even in persons with normal hearts. Shock and hemorrhage are to be expected among battle casualties and their prompt treatment serves to prevent irreparable heart damage.

In addition, there are several predisposing conditions which favor the development of acute coronary insufficiency. In their analysis of 25 patients who came to autopsy, Horn and his associates[35] noted that the heart was hypertrophied in 22; 14 had severe coronary disease, 5 moderate coronary arteriosclerosis, 6 mild or no atheromatosis; aortic stenosis was present in 5; mitral stenosis in 1, and syphilitic aortic insufficiency in 1. The presence of these structural lesions impairs the ability of the heart to make adequate compensatory changes and accordingly renders the myocardium more vulnerable to acute coronary insufficiency. Yater and associates found cardiac hypertrophy in 52 per cent of their patients; it was of marked degree in 16 per cent. Certain nonorganic states, such as chronic anemia and hyperthyroidism, also predispose to coronary insufficiency.[35]

PATHOLOGY

In mild, transitory acute coronary insufficiency no demonstrable changes are found, for the effect of the ischemia upon the heart muscle is entirely reversible. When the ischemia is prolonged or moderately severe, scattered, isolated areas of necrosis result. These vary in size from microscopic foci to larger, grossly visible confluent areas of disseminated necrosis (fig. 3).

The lesions are typically located in the subendocardium and papillary muscles of the left ventricle, and ultimately go on to healing and fibrosis. In the most severe cases, the entire inner shell of the left ventricle may show macroscopic, widespread confluent necrosis, often referred to as "subendocardial infarction." In very rare instances a through-and-through infarct develops.

DETECTION

From the foregoing, the importance of detecting coronary disease in the military services is obvious, in order to avoid ex-

posure to the rigors and strain of military life, including excessive exertion, combat duty, and flying.

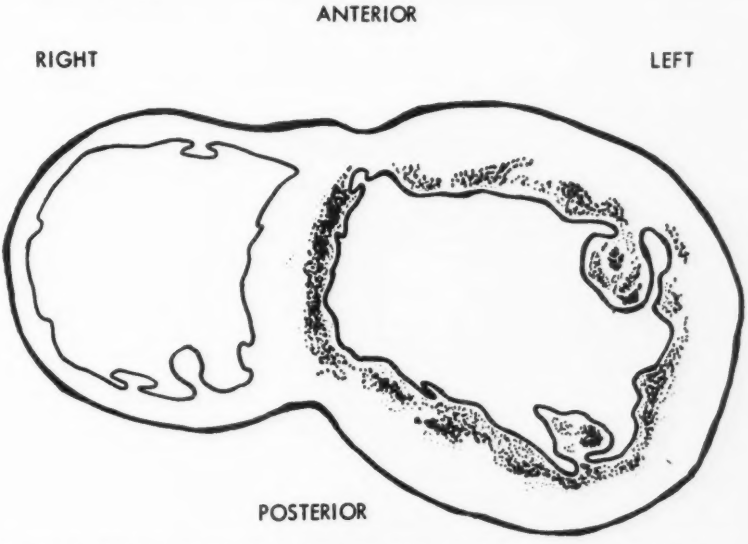

Figure 3. Diagram illustrating extensive disseminated subendocardial necrosis due to severe acute coronary insufficiency. The entire inner shell of the left ventricle was involved. The heart was hypertrophied (575 grams), and moderate coronary arteriosclerosis and aortic stenosis were present. Acute gastrointestinal hemorrhage precipitated the coronary insufficiency.

There should be a greater awareness of coronary disease in young people so that even minor complaints are not overlooked. If there are complaints referable to the heart, a complete cardiovascular examination, including perhaps the 2-step exercise test, should be instituted. It must be remembered that from 40 to 50 per cent of persons with coronary disease and angina pectoris show no cardiac abnormality on examination and have a negative resting electrocardiogram. Such persons, however, almost always show significant changes in the 2-step exercise test.[36] It is doubtful that this will be true in many young men with asymptomatic coronary disease, yet, it would be advisable to perform the test in suspicious cases. It should be remembered that the test is positive in about 10 per cent of persons with normal hearts, particularly in tense, anxious people. Each case should be carefully evaluated.

TREATMENT

If acute coronary insufficiency is secondary to a specific precipitating cause, prompt and strenuous treatment of the latter may be lifesaving.

In *paroxysmal tachycardia,* the acute coronary insufficiency may dominate the clinical picture with precordial pain, shock, and electrocardiographic signs of myocardial ischemia. The institution of measures to abolish the tachycardia, such as carotid sinus pressure, digitalis, quinidine, or vasopressor drugs, is essential. If the tachycardia subsides, the signs and symptoms of coronary insufficiency may disappear abruptly.

In acute infections, particularly pulmonary and gastrointestinal infections, the early administration of the antibiotics may prevent coronary insufficiency.

In shock and hemorrhage, restoration of circulating blood volume, blood pressure, and hemoglobin by intravenous infusion of fluid, plasma, and blood is imperative. We have observed many patients in the coronary age group, and even younger, in whom a sudden, massive gastrointestinal hemorrhage produced severe coronary insufficiency manifested by a clinical state simulating acute coronary occlusion, particularly when the internal hemorrhage was unrecognized. The treatment for hemorrhage is adequate blood transfusion which should be instituted before the myocardium is impaired because, once such a state is reached, intravenous infusion is usually of no avail.[37-40] The value of a daily electrocardiogram lies in the fact that, not only is it an objective sign of coronary insufficiency, but also it reveals RS-T depressions and T-wave inversions which may precede the appearance of clinical evidence of coronary insufficiency. Blood should be administered until bleeding has ceased and pulse rate, blood pressures, hemoglobin determinations, and electrocardiograms have been restored to normal values.

The treatment of angina pectoris which appears during hemorrhage is blood replacement.[23, 34, 41] The occurrence of chest pain or the aggravation of pain ordinarily experienced by the patient constitutes an urgent indication for therapy. It is significant that chest pain appeared in 18 of the 103 patients reported and in each instance blood transfusion effected either amelioration or disappearance of this complaint.[34] The advisability of repeated transfusions may be questioned in patients with organic heart disease, in view of the possibility of inducing left ventricular failure. Such an eventuality is readily admitted. However, we firmly believe that the occurrence of this complication can be prevented, or its severity minimized, even when frequently repeated transfusions are indicated, by careful and slow administration of blood. Constant and studied clinical supervision is imperative.

In surgical procedures, anoxia secondary to anesthesia should be prevented by an open airway and by adequate oxygen intake. One must avoid "pushing" the anesthesia in patients with heart disease or other predisposing factor of coronary insufficiency.

Sufficient oxygen must always be available and proper ventilation is essential. Cyanosis, even if temporary, should be prevented. The type of anesthesia administered, local or general, is less important than the care used in its administration. Postoperative observation and avoidance of pain are extremely important.

Acute pulmonary insufficiency caused by acute pulmonary infection, bronchial asthma, and emphysema is a common precipitating cause for acute coronary insufficiency. The treatment of the pulmonary insufficiency and cor pulmonale with oxygen, bronchodilators, and antibiotics often causes the coronary insufficiency and electrocardiographic changes to disappear entirely. Particular care in the employment of morphine and oxygen is essential since the former may depress respiration in chronic cor pulmonale and high concentration of oxygen may remove the stimulus to respiration. Oxygen is administered intermittently, the percentage gradually increased, and given best under pressure. Bronchodilators such as vaponefrin (brand of racemic epinephrine hydrochloride) are very helpful, and meticorten (brand of prednisone) seems very promising.

In acute coronary insufficiency, recovery from the attack is often complete. We have found that the future outlook of patients following acute coronary insufficiency is usually excellent; more than four out of five live for many years and are able to work steadily.[42, 43] Therefore, it is our opinion that many, if not most, men in the military services who sustain an attack of coronary insufficiency may be retained if they are placed in appropriate lines of duty.[43] Naturally, each case must be evaluated in the light of the cause of the coronary insufficiency and the residual evidence of myocardial disease. Periodic re-examinations should be made and, on the basis of the results, the type of work may be altered from time to time. The majority of these patients should be able to perform useful and even essential work. If anginal pain, dyspnea, or a serious arrhythmia persists, the man should be discharged.

CONCLUSIONS

Acute coronary insufficiency represents a sudden, transitory inadequacy of the coronary circulation for the requirements of the myocardium. It may occur spontaneously or be induced by factors increasing the work of the heart, decreasing the coronary flow, or altering the composition of the blood. It usually occurs in persons with coronary disease and cardiac enlargement but may occur in normal hearts. Death from acute coronary insufficiency is uncommon except in cases of "sudden death." Ordinarily, the patient survives and the outlook is excellent.

Acute coronary insufficiency results in ischemia or necrosis

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of the subendocardial region. Because of this localization, the electrocardiogram presents RS-T depressions and/or T wave inversions, differentiating it from coronary occlusion. In the latter, through-and-through infarction occurs and Q waves and RS-T elevation are present in the electrocardiogram. This differential diagnosis holds in over 90 per cent of cases. The use of the terms coronary insufficiency and coronary occlusion is preferable to the unqualified term myocardial infarction.

Acute coronary insufficiency is probably more common than coronary occlusion. Coronary disease and acute coronary insufficiency are frequent in young men. In order to detect coronary disease, minor complaints referable to the heart should be carefully investigated.

Acute coronary insufficiency is a specific clinical and therapeutic entity, particularly when it is induced. Prompt treatment of the precipitating factor may be lifesaving, *e. g.*, frequent transfusions in hemorrhage. Recovery from acute coronary insufficiency is usually complete and most patients are able to return to work which is not strenuous.

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LEADERSHIP AMONG PHYSICIANS

Physicians must be intelligent—medical schools quickly separate the wheat from the chaff. And they must be capable of a broad viewpoint from which to regard man and his ills, both physical and social, for medicine is no longer a matter of treating disease and ignoring the person. Because of this latter quality, physicians are peculiarly fitted for leadership in every walk of life, especially in a time when men are ruled more often by emotions and fears than by logic and concern for their fellows.

If we have let the duties of our profession, the obligations of social and financial success, and the very understandable desire for security blind us to these obligations of leadership in a time when it was never more badly needed, then it behooves us to pause for at least an hour or two and take stock. No other profession has the fine heritage and glorious traditions that ours has.

—FRANK G. SLAUGHTER
in *Journal of Florida Medical Association,* p. 485, Dec. 1954

DETECTION OF AORTIC INSUFFICIENCY IN RECENTLY INDUCTED MILITARY PERSONNEL

WILLIAM D. SCHIERMAN, *Captain, USAF (MC)*
EDWIN D. BAYRD, *Major, USAF (MC)*

THE MURMUR of aortic insufficiency, when of low intensity, is one of the most difficult of all murmurs to hear. Because it is characteristically high-pitched, soft in quality, and heard best in an area where bronchial or bronchovesicular breath sounds are normally heard, it is easily missed on routine examination. The problem is compounded if the person is obese or the examination takes place in a room where a number of persons are present. In downtown examining stations, room noise may also be combined with street noises to make the perception of the soft aortic diastolic murmur difficult indeed.

Recently, in the course of routine ward and clinic duty at this hospital, three cases with findings of aortic insufficiency were observed. In contrast with this, in the past year and a half, there has been no instance of a previously undetected mitral lesion, and only one other disqualifying condition with associated physical findings including heart murmur (coarctation of the aorta) which was missed on induction but detected later. Thus, it appears that the screening of personnel with aortic insufficiency was most difficult. The following cases were reviewed in an attempt to determine whether similar errors could be prevented from occurring in the future.

CASE REPORTS

Case 1. A 17-year-old airman was admitted to the hospital from the stockade for evaluation of a murmur that had been heard by the medical officer who examined him on commitment to confinement. The airman had been in the service for only 7½ months. While in basic training, he had been hospitalized on one occasion for an upper respiratory infection; no mention was made at that time of a heart murmur. The patient denied any symptoms of cardiac disease and no history suggestive of rheumatic fever in the past could be obtained. Additional past history was noncontributory.

The patient was a well-developed, well-nourished but not obese Negro, 5 feet 8 inches in height and 140 pounds in weight. The sig-

From U. S. Air Force Hospital, Scott Air Force Base, Ill. Dr. Schierman is now at 4161 Lindell, St. Louis, Mo.

nigicant findings were as follows: Blood pressure was 120/10 mm. Hg. The apex impulse was forceful but the heart was of normal size on physical examination. A loud, rushing diastolic murmur, grade IV (basis of VI), persisting throughout diastole, was present. It was loudest along the left sternal border in the third and fourth interspaces, although it could also be heard well in the second interspace to the right of the sternum, and was transmitted over the whole precordial area. A Corrigan pulse, pistol-shot sounds over the femoral arteries, and pulsations in the suprasternal notch were also observed.

Findings of routine blood cell counts, serologic tests, and urinalysis were within normal limits; the sedimentation rate was 2 mm. per hour. An electrocardiogram showed findings of left ventricular hypertrophy (fig. 1) and by fluoroscopic radiographic examination the left ventricle was noted to be slightly enlarged (fig. 2). Throughout his hospitalization the patient's temperature was within normal limits, and evidence of active rheumatic fever was lacking.

A copy of the findings of his induction physical examination was obtained. No mention was made therein of any cardiac murmur or other abnormality. It was interesting to note that blood pressure had been recorded initially as 120/50 mm. Hg, erased, and changed to 120/60 mm. Hg. It was recommended that this patient be separated from the service.

Comment. It was believed that this was a case of aortic insufficiency of rheumatic origin, although a history of rheumatic fever was lacking. The magnitude of the murmur, electrocardiographic and fluoroscopic evidence of left ventricular hypertrophy, and an initial blood pressure of 120/50 mm. Hg suggest that the lesion was present when the airman entered the service.

Case 2. This 22-year-old airman was referred from another air base for cardiac evaluation because of a murmur. He had a definite history of rheumatic fever when 6 years old and a recurrence when he was 12 years old.

He was rejected for military service in January and August 1951, initially for flat feet, and then for a "heart murmur." When he volunteered for the Air Force in January 1954 he was rejected because of "high blood pressure." Shortly thereafter, on routine selective service physical examination for induction into the Army, he was found acceptable, and on the basis of this examination he was subsequently accepted for enlistment into the Air Force in February. The past history was otherwise noncontributory.

Significant physical findings were limited to the cardiovascular system. Pulsations were noted in the suprasternal notch. No cardiac enlargement was found on physical examination; however, the apex impulse was forceful. A grade III diastolic murmur characteristic of aortic insufficiency was heard in the second interspace just to the

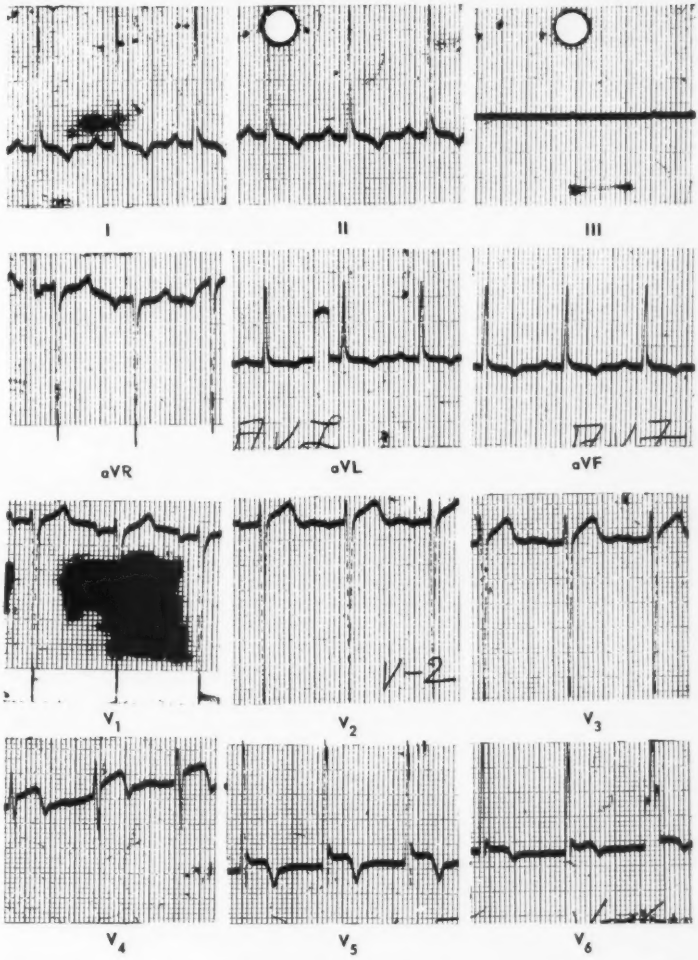

Figure 1 (case 1). Electrocardiogram showing left ventricular hypertrophy. The S wave in V_1 measures 35 mm. The axis deviation index is 32 mm. Upwardly convex S-T segments are present in leads I and II with inverted T waves in leads I, II, V_5, V_6, aVL, and aVF. The QRS interval is 0.09 second.

right of the sternum, and in the third interspace just to the left of the sternum. Blood pressures were as follows: right arm, 160/60 mm. Hg; left arm, 170/60 mm. Hg. Pistol-shot sounds were heard over the femoral arteries. The routine blood cell counts, serologic tests, and urinalysis were normal. The sedimentation rate was normal. Postero-anterior and oblique views of the chest showed no roentgenographic

evidence of chamber enlargement. Findings of an electrocardiogram were within normal limits.

Figure 2 (case 1). Roentgenogram of chest showing somewhat boot-shaped configuration of heart.

While in the hospital for evaluation this airman showed no evidence of rheumatic activity. He was examined in consultation with the civilian consultant in cardiology who concurred in the findings, and the patient was then transferred to appear before a physical evaluation board.

Comment. Because of the intensity of this patient's heart murmur and the history of his having been rejected for military service once for a "heart murmur" prior to his acceptable physical examination for the Army, it was believed that a perceptible murmur was present when this man entered the Air Force.

Case 3. A 22-year-old airman was transferred to this hospital for evaluation of a heart murmur detected on examination. He had a definite history of having had rheumatic fever at the age of 6, and he had

been hospitalized in a convalescent home for 1 year. During his convalescence his family was told that he had a heart murmur. He subsequently was followed throughout his childhood and adolescence by a cardiologist, who told him that he would be acceptable for military service. The only suggestion of recurrence of the rheumatic process after the initial attack was at the age of 12 when the patient noticed transient arthralgia for which he was not hospitalized. The patient had enjoyed unrestricted physical activity without difficulty, up to and including the moment when he appeared at the dispensary. He had been in the service for 2 years and was a jet aircraft mechanic. The remainder of the past history was not contributory.

On physical examination significant findings were again limited to the cardiovascular system. A grade II diastolic murmur was heard in the aortic areas as in the previous cases; however, it was necessary to have the patient lean forward in full expiration to hear the murmur clearly. A grade I to II soft systolic murmur was also heard in the mitral area with the patient in the left lateral position. The blood pressure was 125/60 mm. Hg. No pulsations in the suprasternal notch were noted. Faint pistol-shot sounds were heard over the femoral arteries.

On roentgenographic examination the heart presented a globular shape, but no definite chamber enlargement was found by fluoroscopic examination. Routine laboratory data, including serologic tests, were within normal limits and the electrocardiogram was normal.

No evidence of rheumatic activity was observed during the period of hospitalization. Because he had already had 2 years of service and had only a mild degree of aortic insufficiency, this man was returned to duty with a change noted in his physical profile records.

Comment. The history suggests that this airman probably had a murmur at the time he entered service. With the knowledge of previous rheumatic disease more careful examination at that time might have revealed the murmur.

SUMMARY

Three patients with murmurs of aortic insufficiency presumably unrecognized at induction examination demonstrate the difficulty in detecting this condition on routine examination.

Two patients had a history of rheumatic fever, while a third had an abnormally wide pulse pressure recorded at the time of his qualifying examination for military service. It was thought likely that all three patients had had audible murmurs at the time of their initial examination.

Consideration of these cases suggests that prospective inductees with wide pulse pressure, a previous history of rheumatic fever, or other cardiac abnormalities be examined with particular care to exclude the possibility of aortic insufficiency.

EVALUATION OF PSYCHOTHERAPEUTIC SCREENING FOR ENURETIC RECRUITS

RICHARD W. FIRESTONE, *Lieutenant (junior grade) (MSC) USNR*
CARL M. WAGNER, *Lieutenant (junior grade) (MSC) USN*
DANIEL H. HARRIS, *Ph. D.*

THE PROBLEM of nocturnal enuresis among military recruits is longstanding. In a significantly large proportion of cases terminating in general discharge at the recruit level, enuresis plays a very prominent role. Aside from the obvious inconvenience created for the training command, there is also to be considered the matter of expense involved in recruiting and in prematurely discharging the large number of men who at first are assumed to be intractably enuretic.

Investigation into this general area disclosed that several researchers had produced convincing evidence leading to the conclusion that enuresis in adults is primarily psychogenic in origin.[1-5] With this theoretic assumption as a guide, we suggested[6] and demonstrated[7] in earlier reports that the psychiatric screening interview, serving as a brief psychotherapeutic situation, could effectively aid many "borderline" enuretics who in the past might have been discharged as hopeless. Specifically, the screening interview was modified to include a permissive and reassuring discussion designed to relieve anxiety associated with enuresis, together with an attempt to focus positive motivation through plausible behavioral suggestions for overcoming the habit. Experimental results indicated that this procedure was instrumental in reducing by 60 percent the number of potential discharges among enuretics who were so treated, by enabling them to become asymptomatic.

PURPOSE OF THIS STUDY

The therapeutic procedure described above was experimentally verified under necessarily stringent and formalized conditions. Sufficient time having elapsed since the termination of the experimental test period, it now seems appropriate to evaluate the extended effectiveness of this procedure as, less rigidly applied, it has been incorporated into a working routine for the day-to-day screening of enuretic recruits. Whether or not it is practicable, after all, can only be judged under average working conditions which have little in common with the refined control of an experimental atmosphere.

From Marine Corps Recruit Depot, San Diego, Calif.

If the hypothesis implied here is valid, then its effect should be reflected in a lower discharge rate for enuretics. In order to evaluate this, all enuretic recruits considered for discharge during equivalent periods before and after the experiment were reviewed, particularly with regard to their final disposition.* The recruits chosen were those in process during the two periods of 41 consecutive weeks preceding and following the experimental test period. Because it is sometimes alleged that enuresis increases in cold weather, both periods included all of the winter months in order to rule out any spurious effect from this source. Data used in this study included the aptitude board decision on each recruit, the General Classification Test (GCT) score, and the psychiatric impression on initial screening (PULHES "S" profile). Equating for general intelligence as measured by the GCT was accomplished by including only persons having scores above 65 (equals Navy GCT of 29). Results of the "S" profile comparisons will be discussed at length below.

RESULTS

A breakdown of the relevant data (table 1) indicates that the aptitude board discharged a substantially smaller number of enuretics in the postexperimental period. On statistical analysis, the 26 percent difference between the pre- and post-experimental groups was shown to be highly significant; *i. e.*, the probability that this result could have occurred by chance alone was negligible. Since the only consistent differentiating factor known to be operating was the therapeutic variable, the results achieved may be attributed to it with a fair degree of certainty. This tends to reaffirm both the soundness and utility of the therapeutic principles developed in our experimental report.

TABLE 1. *Recruits discharged by the aptitude board during pre- and post-experimental periods*

Recruits discharged	Before experiment	After experiment
Total	375	240
Enuretics	229 (61%)*	90 (35%)*

*Chi-square analysis revealed this difference to be significant at better than the .01 level.

To further amplify a comparison of the two groups of recruits, a breakdown was made of the "S" categories to which they were assigned during initial screening. The postexperimental group, as shown in table 2, contained a much higher percentage of psychiatric "suspects," which might suggest that this group was

*Identical criteria for consideration and discharge of such cases were in effect before, during, and after the experiment.

composed of generally poorer material. An alternate supposition could hold that because the "borderline" group of enuretics in the postexperimental group never appeared before an aptitude board due to therapeutic intervention, the 90 discharged persons were the most recalcitrant ones, among whom it could be argued there would be a higher percentage of suspects. While either assumption would lend weight to the implications of the results in table 1, supportive evidence is lacking in both instances.

A better explanation for this discrepancy may lie in the fact that, as a carryover from the experiment, more thorough screening technics were employed with the later group. This could very reasonably have increased the percentage of suspects discovered. The latter possibility also reinforces an hypothesis which the authors voiced in their experimental report with regard to the value of early detection. As in other areas of military psychiatry, the preventive value of early detection is also an important guide in psychiatric screening.

TABLE 2. *Percentage of "S" profile categories assigned during pre- and post-experimental periods* (see text)*

Category	Before experiment (percent)	After experiment (percent)
S-1	40.8	21.9
S-2 plus S-3 (suspects)	59.2	78.1

*Chi-square based on frequencies for the "S" profile categories was significant beyond the .01 level.

THEORETIC CONSIDERATIONS

If one accepts a psychogenic explanation for adult enuresis, and recent research tends to support such a decision, then it follows that psychotherapy is the treatment of choice. One very recent confirmation is a well-controlled electroencephalographic study on the sleeping levels of enuretics, in which Ditman and Blinn[2] reached these same conclusions regarding causation and treatment. Closson and Hildreth[3] have already demonstrated the usefulness of psychotherapeutic screening in raising the efficiency of recruit training units. With this experimental background, it was not unreasonable to expect that the essential practicability of combining brief psychotherapy for enuretics with initial screening might be strongly indicated.

The effectiveness of this procedure is largely due to the timing and nature of the initial screening interview. Of prime importance is this early opportunity for the new recruit to disclose and re-

ceive help with his problem, motivated as he is toward success and by the stresses he has begun to experience in training. His unique receptivity at this early point in training is a crucial factor. It is believed that the "therapeutic" accepting attitude of the screening interviewer, being one of the first private contacts which the recruit has with an authority figure in a new setting, will tend to have a lasting positive effect.

With most persons the brevity of the interview is apparently no drawback to its effectiveness; nor is a rigid procedure a necessity. As this study demonstrates, significant results were achieved despite a flexible and individual application of therapeutic principles during a very brief period (about 3 minutes). The only attempt at uniformity involved a general acceptance of the necessity for a permissive attitude by the interviewers. Introduced strategically as it was, this resulted in sufficient anxiety reduction to effect a cessation of the habit in many borderline cases of enuresis. The procedural flexibility also had the important advantage of permitting the interviewer to "tailor" the treatment of each case according to his clinical judgment.

The effectiveness, brevity, and flexibility of this approach for handling enuretic recruits speak strongly for its usefulness in the military service. Incorporation into the regular screening routine is possible with little modification beyond emphasizing a psychotherapeutic orientation for the psychiatric staff. The statistics shown in table 1 imply a significant budgetary saving which may be augmented if further research makes it possible to reach, beyond the borderline enuretic to effective treatment for less promising cases.

SUMMARY AND CONCLUSIONS

Research to date has tended to establish that psychotherapeutic screening for enuretics is both valid and useful. The following formulation expresses our current thinking as it has evolved from this work.

1. The permissive, interested and accepting attitude of the screening interviewer, a benevolent authority encountered by the recruit at a crucial time in his military training, is the foundation of this technic.

2. The recruit's positive motivation for overcoming the habit may be reinforced by appropriate behavioral suggestions concerning such things as liquid consumption, scheduled nighttime urination, et cetera.

3. Follow-up interviews are desirable in some cases, both to determine progress and to provide additional therapeutic support when necessary.

4. Therapeutic effectiveness is not based on the screening interview alone. The psychotherapeutic orientation of the entire psychiatric unit provides an atmosphere in which this procedure produces the best result.

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THE CHANGING PICTURE

In both Europe and America, in industrialized Western European civilization, there is evidence of a striking decline in the gross physical manifestations of hysteria, of the old major hysteria with large loss of motor or sensory functions. The symptoms of hysteria have become more modest, disguised and obscure, and we encounter more frequently hysterical features in many other disorders: anxiety states, character disorders, and such diseases as thyrotoxicosis, essential hypertension, colitis, vomiting in pregnancy, et cetera. There is statistical evidence also that these arbitrarily called psychosomatic disorders are showing a real increase in incidence not accounted for by more frequent diagnosis.

—WILLIAM A. HARVEY, M. D.
in *Annals of Surgery*
p. 137, July 1955

THE RECOGNITION AND MANAGEMENT OF PSYCHIATRIC EMERGENCIES

CHARLES E. HERLIHY, *Lieutenant (MC) USN*
DEAN J. PLAZAK, *Lieutenant (MC) USN*

MANY SITUATIONS that are referable to psychiatric conditions and that require prompt action on the part of medical personnel arise in the setting of a general hospital. It is essential that these emergencies be properly recognized and that the patient be referred for early and necessary psychiatric therapy. This preventive aspect remains a most important goal in the practice of medicine.

SUICIDE

Perhaps the first word that comes to mind when one thinks of a psychiatric emergency is suicide. When a patient succeeds in taking his own life, the feelings of guilt engendered in the staff and family may be very great. There is always embarrassment to the hospital management, not to mention the blow to public relations in the community. Suicide occurs chiefly among the agitated depressed, disturbed psychotic, and delirious patients. At times there is no way of preventing one of these patients from taking his life, because of the swiftness with which he may act. On the other hand there often are clues suggesting that the patient may attempt self-destruction. Generally a patient will commit suicide when going into or coming out of a depression. These are times when psychomotor activity is sufficiently great to allow the patient to expend the energy required to complete the act.

Recognition of early depression is important. The most significant features are a decrease in psychomotor activity, an expression of hopelessness or despair, and talk of suicide. There usually will be a history of a withdrawal of interest from usual activities and an inability to make plans for the future. Loss of appetite and disturbance of sleep are also often prominent in early depression. The patient may have difficulty in falling asleep, but more often he awakes in the early morning hours. If agitated, he may pace the floor. This type of sleep disturbance is a serious sign, because many successful suicides occur in the early morning.

From U. S. Naval Hospital, Bethesda, Md.

Multiple somatic complaints may be early symptoms of depression. One should get a base line of organic studies, at the same time investigating the life situation of the patient to learn something of his feelings about himself, his goals for the future, and his immediate associations. In the middle-aged patient the complaint of headache may also mask a depression. Management of this type of emergency requires interest in the patient and an attempt to get him to discuss himself instead of his symptoms.

It is well to talk with a member of the family close to the patient regarding his mood and behavior. A problem in the management of the depressed patient is the inherent danger in dispensing barbiturates for sleep disturbances. One must think of the possibility of patients saving barbiturates, remembering that only 10 to 15 times the hypnotic dose of most barbiturates causes death in the average person.[1] It is also important that the physician dispensing barbiturates on an outpatient basis knows fairly reliably how much sleep the patient is getting and what is happening to the medication. Often a member of the family should dispense the medication. It is wise in this respect to advise some member of the family that sleep disturbances frequently are forerunners of depression.

Any attempt at self-destruction must be looked upon with seriousness, because even the gesture of the immature or hysterical patient indicates a serious disturbance in personality and requires thorough evaluation. The suicide gesture usually is seen in the immature, emotionally unstable person or the hysterical personality who may slightly "nick" one or both wrists, take a little bit of iodine or bleach, or swallow three or four sleeping pills. These people hope by such behavior to gain something in their interpersonal relationships.

Once a potentially suicidal patient has been recognized, there are several important considerations in management. He should be placed in a private room with a special watch at all times. The room should be at ground level if possible. There should be a minimum of furnishings: a bed, a chair, and perhaps a night table. One can never be too cautious in removing all articles with which the patient might hurt himself—razor blades, knives, pointed instruments, strings, and ties of any kind. It is wise to avoid the use of drawstring pajamas and to remove shoelacings. The patient should never be left alone.

It is not necessary for the physician to be afraid to discuss suicide with his patient. It is often the physician's own anxiety that prevents this discussion. It may make a difference in management if he evaluates the quality of the attempt through the choice of method. This helps him to decide in the emergency room whether the patient will remain in the hospital or whether

he can be released. It may be more therapeutic and even advisable at times to release the immature person whose gesture has been an attempt to gain affection, love, or understanding. Recognizing some of these features may allow the physician to accomplish this without anxiety.

ACUTE INTOXICATION

Intoxication may exist alone or accompany serious injuries or physical illnesses. The importance of a good physical examination cannot be overstressed. If a good objective history has not helped to identify the intoxicating agent, it is helpful to keep in mind three principal types of drugs: alcohol, bromides, and barbiturates. Routine evaluation of the intoxicated patient should include the examination of blood for all three.

On physical examination, in addition to the frequent appearance of excitement, loss of co-ordinated control, and combativeness, the intoxicated patient usually has injected sclerae and a characteristic breath odor; he also may be incontinent. It is not enough to send this type of person home to "sleep it off." Intoxication represents an acute physical illness and should be so treated. Acute alcoholic death is seen with greater frequency than is generally realized. One often reads in the newspaper of the alcoholic who dies in jail unattended. We show great concern for a child or an adult who has accidentally ingested some other intoxicant, but we do not always have the same feeling about the victim of alcoholism. It is not remiss to take the patient to a quiet location, provide him with necessary personal attention, and administer intravenous fluids and vitamins in order to help detoxify him more rapidly.

Barbiturates have been included in the discussion of acute intoxications because of their widespread use and the frequency of acute barbiturate poisoning. It is a great temptation to give barbiturates in order to calm a patient or induce sleep. It is well to remember that in physically ill people smaller dosages are required for a hypnotic effect. In the emotionally ill patient a greater amount of drug may be required, and there is a great temptation to employ large dosages. It is imperative to recall the lethal dosage when dispensing barbiturates regularly to the same patient.[1]

An important factor to consider in handling acute barbiturate intoxication is the possibility of the acute withdrawal reaction. Physicians often fail to think of barbiturates as addicting drugs. A patient using large amounts of barbiturates will show a true physiologic reaction on withdrawal of the medication. One must be prepared for this because of the possibility of convulsions and psychotic reactions. If the patient does exhibit a withdrawal

reaction in the form of restlessness, twitching, convulsions, or psychosis, it becomes necessary to reduce the barbiturate dosage gradually, preferably using a different type of barbiturate from the one to which the patient has been addicted.

On physical examination the patient with barbiturate intoxication may show varying degrees of clouding of consciousness, slurred speech, and nystagmus. Reflexes may be normal or hypoactive, and he may not react to noxious stimuli. If the vital signs are stable and remain so over a period of 2 to 6 hours, no other treatment than gastric lavage, maintenance of an adequate airway, and intravenous nutrition is usually necessary. If the patient is in deep coma and vital signs are unstable, intravenous caffeine and sodium benzoate or amphetamine every two hours should be given. It is seldom necessary to use picrotoxin or metrazol (brand of pentylenetetrazol). Intravenous or intragastric feedings may be used. Penicillin given prophylactically is valuable because of the high incidence of pulmonary infections. Recently the use of electrostimulation and of specific chemical antagonists to the barbiturates has been described in the emergency treatment of acute barbiturate overdosage.[2, 3]

Only 25 percent of patients with bromide intoxication have a bromide rash. These patients more frequently show evidence of increased lacrimation and salivation, marked mental aberration with incongruity of thinking, and unusual, bizarre visual hallucinations. The blood bromide level will usually be elevated above 150 mg. per 100 ml.[1] If possible, it is well in bromidism to use oral medication at first, because too rapid introduction of sodium chloride will cause bromides to go from tissue to blood, thereby elevating the level and causing symptoms to persist. Mercurial diuretics during the first 48 to 72 hours often will aid materially in eliminating the bromide.

Acute amphetamine intoxication is worthy of mention because of the widespread use of this seemingly harmless stimulant. Following excessive use of an inhaler or after ingestion of tablets there may be restlessness, tremors, insomnia, talkativeness, and irritability. In children, confusion, delirium, and hallucinations have been observed. Following excessive oral ingestion, anorexia, nausea, vomiting, and diarrhea may occur; and convulsions, circulatory collapse, coma, and death may follow. Treatment generally consists of gastric lavage and symptomatic care. With marked overdosage, use of luminal sodium (brand of phenobarbital sodium) may occasionally be indicated, but it is cautioned that, in children especially, this may add to the patient's excitement and irritability.

The excessive use of aspirin and antihistamines is frequently a cause of acute intoxication, especially in children; and a vari-

ety of other pharmacologic agents may be implicated in acute intoxications.

The question of physical restraints frequently arises in handling the acutely intoxicated patient, particularly if he becomes assaultive and combative. It is best if possible to use no restraints on an acutely intoxicated patient because of the marked "panic" which occurs as a result of his confusion. If restraints are necessary, one can use a rolled-up sheet to each extremity, with enough talcum to protect from burns. There seldom is any physical injury from such restraint. The patient also must be protected from his own anxiety and fright during the state of the acute intoxication: self-injury from running into walls, breaking furniture, and even jumping from windows is very common. If available, a warm circulating-water tub with protective cover is excellent.

DELIRIUM

The mental picture in delirium is clouding of consciousness and gross distortion of perceptions. Clouding of consciousness is characterized by disorientation, especially in the spheres of time and place. The distortion of reality is manifested by hallucinations. These, though sometimes auditory, are usually visual, and what delusionary ideas may be present are built around the hallucinations. The characteristics of the hallucinations found in deliria are bizarreness and ill-defined quality. It is difficult to find any thread of reality in these expressions. As an example, a visual hallucination sometimes observed in alcoholic delirium is one of water coming out of the walls or the ceiling, or of the alleged appearance of large buses, trucks, or railroad trains coursing through the patient's room.

Of the multiple causes of delirium the syndrome of acute delirium tremens is one which often is observed in a general hospital, both as an entity and in association with other illnesses or trauma. A recent study indicated that abstinence after a prolonged, high alcoholic intake is not the most important factor in the development of delirium tremens. Intercurrent trauma, such as fracture, febrile illness, or other acute or chronic assaults upon the patient's physical condition, in an individual who is a continual heavy drinker, is often the triggering factor.[4] One aspect of this illness that is not often appreciated is its high mortality rate, which is sometimes reported as from 30 to 45 percent.[5]

With this possibility in mind, one can perceive the need for immediate and intensive therapy whenever this disorder is diagnosed. The patient's mental state is similar to that of the general picture in acute delirium. Prevalent physical signs are gross

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tremors throughout the body, particularly in the hands and tongue; generalized hyperhidrosis, with associated signs of dehydration; hypertension; marked flushing, particularly of the face and chest; hyperemia of the sclerae; nausea and vomiting; a sporadic febrile curve; and weakness. Prognostically, inability of the patient to respond to 36 hours of continuous treatment necessitates a guarded outlook for recovery, and lack of response after 48 hours of continuous treatment gives the patient a poor outlook for life.

An immediate treatment which can be given either in the emergency room or in the ward is intravenous administration of 50 ml. of 50 percent dextrose to which is added from 300 to 500 mg. of ascorbic acid, 100 to 200 mg. of thiamine hydrochloride, and 10 to 15 units of regular insulin. This may be repeated within 3 hours. Following this a simple but effective therapy is continuous intravenous infusion of 10 percent dextrose in water, administered at a rate of 1,000 ml. every 5 to 6 hours. The immediate treatment with hypertonic dextrose, vitamins, and insulin reduces cerebral edema, and the subsequent continuing infusion of 10 percent dextrose decreases the severe, generalized body dehydration that often is present. The latter is administered around the clock for 24 to 48 hours, depending on the response of the patient. Parenteral preparations containing a combination of the B vitamins and ascorbic acid may either be added to the intravenous solution in amounts of two to three times the usual therapeutic dosage, or may be administered intramuscularly at 8- to 10-hour intervals. It has been observed that the early use of intravenous fluids, and their continued use thereafter until the delirium has abated, bears a direct relationship to early quiescence of the gastric disturbance, allowing the patient to take sufficient nutriments by mouth much earlier.

Adrenal cortical extract in dosages of from 5 to 10 international units, added to each 1,000 ml. of intravenous fluid, has proved useful where the disorder is more severe. Adrenocorticotrophic hormone is usually reserved for those cases believed to have a more serious prognosis. Recently chlorpromazine hydrochloride in small dosages has been reported to be therapeutically effective in quickly ameliorating the delirium.[6] A very important consideration is the administration of an adequate but relatively nondepressing sedative. Paraldehyde is the drug of choice and 15 to 20 ml. may be given every 6 hours, either orally or in divided intramuscular doses.

The patient should be placed by himself in as plain and nonstimulating an environment as is possible to obtain. Special nursing care is mandatory for at least the first 24 to 48 hours. When oral nutriments become feasible, a high-protein, high-carbohydrate diet should be given, along with multiple frequent feedings of milk. In the recovery phase of the illness the main-

tenance of a relatively quiescent environment, with the addition of mephenesin in a dosage of 500 mg. four times a day, is helpful. High vitamin B and C therapy should be continued intramuscularly if the oral dosage form is not well tolerated.

Acute alcoholic hallucinosis is in essence an acute delirium of the same magnitude as delirium tremens, with a paucity of associated physical findings. The treatment for the disorder is the same.

A large number of acute delirium disorders have organic illness as a basis, and there is an almost endless list of causative factors.[4] Among the more common are cardiac decompensation, hepatitis, infectious mononucleosis, uremia, diabetic coma, hyper- and hypo-thyroid states, avitaminosis, pernicious anemia, eclampsia, infectious diseases, postviral encephalitis, postdrug hemorrhagic meningitis, neoplasm with metastases, and severe trauma (particularly severe burns) to either the head or body.

The rather bizarre mental picture often seen in infectious diseases bears infinitely more relation to the toxins present than to the fever. It is not unusual to find these disorders in patients with a relatively low febrile curve. In some of the more common viral illnesses of childhood, a subsequent encephalitis has been reported as occurring in 11 percent of patients in a large series.[7] Any episode of marked behavior change or acute excitement in the course of such an illness should make one suspicious of central nervous system involvement. Avitaminosis often presents a unique picture involving tactile hallucinations that the patient may describe as feelings that worms are crawling and burrowing beneath the skin or that multitudes of small bugs are crawling up and down the skin. Delirium associated with hyper- or hypothyroid disorders may have as its basis a primary disorder of the anterior pituitary gland, such as pituitary myxedema.

The associated mental disorder in this type of delirium is not functional, but has its origin in the primary organic illness. Thus, therapy evolves around the treatment of the organic illness, and when this abates so will the associated delirium. The associated mental syndrome may interfere with the adequate treatment of the organic illness by reason of its ability to induce anxiety in both the patient and physician. Attempted suicide may be the end result in response to either visual or auditory hallucinations within an acute delirium associated with organic illness.

ORGANIC MENTAL SYNDROMES

Mental disorders caused by cellular changes in brain structure due to vascular or other causes are often found in association with other illnesses. Senile dementia, the commonest disorder

of this type, is interesting as a social problem. This illness frequently becomes a matter of personal concern to the physician, either when it occurs in his own family or in the families of friends and patients who come to him for general advice.

Organic mental syndromes occasionally present a picture calling for emergency measures. These are characterized by excitement, disorientation, and confusion. Simplification of the environment and judicious use of sedatives such as chloral hydrate, paraldehyde, and more recently chlorpromazine hydrochloride constitute the treatment of this syndrome. These disorders frequently produce anxiety in relation to specific occurrences in behavior. Isolated episodes of peculiar behavior, such as a brief flurry of paranoid ideas, an unusual or aberrant sexual act, or confusion in solving a life situational problem, are much more common representations of the beginning of an organic mental syndrome than is a progressive loss of ability to remember, or a deterioration of personal habits.

A careful evaluation of this type of disorder in its incipient stages may be of value in helping those who surround the patient to adjust to the condition, and to assist him in a more orderly adjustment to the continuum of deterioration. The administration of such agents as metrazol in small dosages is of definite value in assisting with this adjustment. Each patient must be evaluated carefully as to need for various types of care. Many times the personal anxiety of the patient's associates over such a syndrome may far outweigh the severity of the disorder itself.

It is important to keep in mind the group of disorders known as the presenile dementias. Such disability, ordinarily expected well after the age of 60, may begin in the fifth or sixth decades; it is more often detected in the military setting because of frequent close physical scrutiny of personnel. Patients with this type of illness require a very thorough neuropsychiatric evaluation.

ACUTE FUNCTIONAL EMOTIONAL DISTURBANCES

Acute emotional disturbances of functional origin are characterized by loss of adequate behavioral or thinking control. This loss may be manifested by an uncontrolled excitement of varying degree or by a severe inhibition. The latter condition includes the acute hysterical conversions. This type of disorder is frequently observed by a physician in a dispensary or emergency room. By its very nature, that of loss of control, it often creates considerable anxiety in the attending staff. It is important that this anxiety does not lead the physician to use hasty and erroneous methods in handling such disorders. One example of this, frequently observed, is the immediate placing of an excited patient in complete restraint before any evaluation is carried out; another is the equally hasty procedure of giving the patient

sedatives without first determining what is represented by the disorder. The possibility that such an acute excitement may have resulted from either head injury or severe internal injury causing a toxic condition should always be considered.

The best initial approach to a disorder of this type is the use of all perceptive senses. Observe the behavior of the patient. Listen to what he has to say with attention, not so much to the words themselves as to the fashion in which they are spoken and used. A careful evaluation of the symptoms is valuable. The time of onset and quality of the symptoms are often helpful in diagnosis as, for example, in stocking-glove anesthesia or in sudden onset of aphonia or tunnel vision. The quality of the emotional expression, the way in which the story is told, is helpful in that the patient often is not at all concerned over the symptoms that he describes. He does not show the anxiety and feeling about his symptoms that an organically ill patient invariably has.

The second important step is an adequate chronological history. This history is not always obtainable *in toto* from the patient, but there generally is someone, if we take the time to find him, who knows something of the onset of the disorder and has an idea of what the patient's previous difficulty has been. The absence of physical findings to substantiate the complaints presented is an important factor in determining the causes of the disorder.

One should bear in mind that episodes of behavioral excitement, sometimes associated with organic complaints, are extremely common. They often represent transient situational behavior in response to specific stress, which by no means implies a serious continuing mental disturbance. Sometimes one will be able to elicit a history of the previous occurrence of such episodes.

In the treatment of these disorders it is most helpful to show an interest in the patient; to listen to him, watch him, talk with him. As a corollary of this, the physician should avoid becoming anxious or excited in his approach to the problem. If this occurs, it increases the anxiety and excitement of the patient, and reduces his confidence in the physician. An interested and calm approach to the patient will often result in the cessation of his behavior and abrogate the need for further immediate therapy. If it does not, the physician must still, with the same calm approach, consider the use of appropriate sedation or restraints. In this matter, his real professional capacity and ability to handle people reveal themselves to all concerned.

A factor which might contribute to the physician's anxiety in this connection is his own livelihood, which invariably enters

into the handling of any patient. In the military setting physicians are, uniquely, not particularly bound by these problems. It is possible to be perfectly frank and honest with the patient in referring him for needed help and in discussing with him the emotional import of his disturbance. This honesty with the patient is often sufficient therapy. He often fully recognizes that his is an emotional difficulty and is only looking for the understanding reassurance of someone who is interested enough to help him through the episode.

Placing a patient with a conversion paralysis in a "straightjacket" or leather cuff restraints, or even placing a patient with a marked excitement in such a situation without first discussing the matter with him, belies the common-sense approach in dealing with emotional problems. When restraints are necessary, sheets used in the fashion of a wrap-around are often sufficient to assist the patient in overcoming a generalized physical excitement.

Sedation should be used only after obtaining a fairly accurate appraisal of the patient's difficulty. This necessitates discussion of the difficulty with him and an adequate explanation to him of why one is going to use sedation. One of the most effective sedatives is a combination of 1.5 mg. of apomorphine hydrochloride and 0.4 mg. to 0.6 mg. of scopolamine hydrobromide administered by hypodermic injection. The scopolamine may be repeated at intervals of from 3 to 5 hours as necessary. Occasionally this may cause vomiting, but in general one finds that it works well even in acutely disturbed psychotic patients.

The extremely disturbed or violent patient calls for a different approach. One should certainly avoid all semblance of aggressiveness in approaching the patient. It is a well-known fact in mental hospital practice that a firm approach to the patient with appropriate explanation, using a show of adequate personnel and without the use of physical force or restraint of any kind, frequently will quiet the patient because he recognizes the respect for his very disturbed state. Involvement in fights, or aggressive actions and verbalizations toward the patient, indicate only our own fear of inability to deal with the problem.

SUMMARY

Suicide, acute intoxication, delirium, organic mental syndromes, and acute functional emotional disturbances have been discussed with reference to their specific treatment or management in a general hospital.

Successful suicide attempts occur chiefly among the agitated and disturbed psychotic, depressed, and delirious patients. Recognition of early depressive symptoms is an important preventive measure. Suicide gestures are important indicators of underlying emotional disturbance.

Complications in treatment of organic and functional illnesses are sometimes referable to injudicious use of barbiturates. Bromide or amphetamine intoxication requires prompt recognition for effective treatment.

Alcoholic intoxication should be treated as a serious illness. The mortality rate in delirium tremens is higher than often recognized. More important than withdrawal as a causative agent is intercurrent trauma or illness in a heavy drinker. Prompt use of intravenous fluids often results in a more rapid recovery. Delirium associated with physical illness will abate with recovery from the organic disease.

The attitudes and feelings of persons concerned with patients who have organic mental syndromes need to be recognized as factors in the therapy of the patient.

Careful evaluation of the history of acute functional emotional disturbance and close attention to the verbal and behavioral productions of the patient will assist in making the correct diagnosis. The necessity for medical personnel to recognize the role of their own feelings as they arise in the management of these problems is considered paramount.

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Don't confuse hypothesis *and* theory. *The former is a possible explanation; the latter, the correct one. The establishment of theory is the very purpose of science.*

—Martin T. Fischer

CONGENITAL IMPERFORATE ANUS

LUTHER G. BELL, *Captain (MC) USN*
FRANCIS M. SMITH, Jr., *Lieutenant Commander (MC) USNR*

CONGENITAL imperforate anus is an abnormality that, unless associated with an adequate fistulous tract to the outside of the body, is incompatible with life. This lesion is one that can be adequately treated by the general surgeon who is aware of the basic principles involved in the surgical repair of this disorder.

In the past 5 years there have been 10 patients with congenital imperforate anus treated at this hospital. To these have been added two cases seen by the junior author during this period. The 12 cases reviewed in this report are summarized in table 1.

DIAGNOSIS

Obviously the diagnosis is made by simple inspection. Physical examination of the newly born infant should identify the lesion of imperforate anus prior to the onset of any suggestive symptoms. Imperforate anus is also often detected when the nursery attendant is unable to insert a rectal thermometer. In the female an associated rectovaginal fistula may prove to be a pitfall. There have been cases on record of these going several years without being recognized.[1]

PREOPERATIVE MANAGEMENT AND EVALUATION

As soon as this lesion is recognized, plans should be made at once for early surgical correction. Careful planning means full and rapid evaluation of the infant. At no time in the neonatal period is a full term infant better equipped to withstand the shock of operation than in the first few days of life. He is in a state of optimum fluid and electrolyte balance that can do nothing but deteriorate progressively with each day of delay.

The first step in the evaluation of the infant with an imperforate anus is to look for other associated congenital anomalies.[2] Congenital abnormalities are usually multiple rather than single. Because of the close relationship in the embryologic development of the cloaca and the urogenital sinus, associated anomalies most frequently are found in the genitourinary tract.

From U. S. Naval Hospital, San Diego, Calif.

TABLE 1. *Operative and postoperative data on 12 patients with congenital imperforate anus, with or without associated congenital anomalies*

Case number	Age at operation	Sex	Type of congenital imperforate anus[4]	Surgical procedure	Associated congenital abnormalities	Result and follow-up
1	7 days	Female	No. 3	Incision and anoplasty Repair of rectovaginal fistula	Rectovaginal fistula	Fecal impaction at age of 3 months that required removal through abdominal operation; otherwise uneventful recovery.
2	5 days	Male	No. 3	Perineal anoplasty	1. 2-mm. fistula in raphe perinei 2. Patent ductus arteriosus 3. Meckel's diverticulum	Died 3 weeks after surgery. Aspiration of formula with atelectasis. Autopsy performed.
3	1 day	Male	No. 2	Incision and anoplasty	None	No difficulty except constipation.
4	1 day	Male	No. 2	Incision and anoplasty	None	Constipation; rectal prolapse at 6 weeks of age.
5	3 days	Male	No. 3	Colostomy	1. Right lung bound down by adhesions (surgically freed) 2. Hypoplasia of right lung	Still has colostomy. No correction of imperforate anus done to date.
6	5 days	Male	No. 3	Colostomy	1. Asymmetry of face 2. Malformation of bones of right lower leg 3. Congenital absence of right kidney 4. Multiple hemivertebrae	Died. Aspiration with atelectasis 3 days after colostomy. Autopsy performed.
7	1 day	Female	No. 3	Abdominoperineal procedure Repair of fistula and anoplasty	Rectovaginal fistula	Aspiration of dextrose feeding 48 hours after operation; developed atelectasis but survived. To date no difficulties.
8	5 days	Male	No. 2	Stab wound	None	Procedure done by osteopath in office. Child has done well to date.
9	2 months	Female	No. 3	Colostomy followed by definitive repair at 3 years of age	1. Intra-atrial septal defect 2. Rectovaginal fistula	Discovered, by senior author, at 2 months of age. Attempt at definitive surgical correction resulted in myocardial failure. Patient digitalized, then colostomy done. Definitive repair done at age 3.
10	2 days	Male	No. 2	Incision and anoplasty	None	No difficulties encountered.
11	3 months	Female	No. 3	Perineal anoplasty	Rectovaginal fistula	No difficulty to date.
12	9 months	Male	No. 3	Revision of colostomy Cardiac massage Colectomy (partial)	Recto-ureteral fistula	Cardiac arrest and death in immediate postoperative period.

The most common associated lesions of the genitourinary tract are rectovesical fistula and recto-urethral fistula.[3] If there is a fistula between the bowel and the genitourinary tract, a voided specimen of urine may reveal gross evidence of meconium. A centrifuged sample may show lanugo hair and cornified epithelial pearls. Once this has been demonstrated, a No. 8 Foley catheter should be introduced into the bladder. A clear specimen of urine from the bladder plus a meconium-contaminated specimen of voided urine should favor the presumptive diagnosis of recto-urethral fistula.

In the female a rectovaginal fistula may occur. These are most frequently found near the fourchette.[2] In patients of either sex a rectoperineal fistula may occur. In the female it opens between the rectal dimple and the vagina. In the male the opening is at the base of the scrotum or along the raphe perinei. Depending on the patency of the tract, meconium may or may not be seen to exude from this opening. In Gross's[4] series, recto-urethral fistulas occurred in 11 percent, rectovesical fistulas in 10 percent, rectoperineal in 20 percent, and rectovaginal in 25 percent of his patients.

Other congenital anomalies may frequently be associated. Gross's series reveals that 198 of 507 patients, or 39 percent, had other associated anomalies. Some of these may take precedence over the imperforate anus. High gastrointestinal tract atresia is an outstanding example. Atresia of the esophagus with associated fistula to the pulmonary tree may co-exist with imperforate anus. Obviously, these lesions must be coped with first. Atresia and stenosis of the small bowel may be present. In short, it may be stated that the first step should be an evaluation of the patency of the gastrointestinal tract above the rectum.[5] Perhaps the simplest method by which to obtain this information is the roentgenographic studies suggested by Wangensteen and Rice.[5]

Anteroposterior and lateral views are made with the infant in the inverted position, and a radiopaque marker is placed over the anal dimple. If air is found throughout the gastrointestinal tract and in the large bowel, the patency of the gastrointestinal tract can be assumed with but one exception, this being esophageal atresia with a fistula between the distal segment and the pulmonary tree. Other important information obtained from this study is the distance between the rectal air column and the anal dimple as identified by the radiopaque lead marker. When the end of the bowel lies far up in the pelvis it should at once suggest the possibility of a recto-urinary tract fistula.

Next, one's interest should be centered on possible cardiopulmonary lesions. In one of our cases an infant had a completely

unexpanded right lung due to a developmental defect which had resulted in a lung bound down by pleural membranes. Congenital cardiac malformations are fairly frequently associated lesions. This lesion occurred in 8 percent of the patients in Gross's series and in one of ours. Careful auscultation of the heart plus routine roentgenograms of the chest should be a part of the evaluation of these infants. If a congenital cardiac lesion is found, careful attention must be given to intravascular administrations of fluid. Occasionally atelectasis may be encountered. This was observed in two of our patients. When marked, atelectasis can affect the patient's condition so severely that definitive surgery must be delayed and palliative measures undertaken.

The second step should consist of measures to prepare for operation. In the cases diagnosed early, that is, in the first 24 hours of life and in full term infants, no fluids need be administered preoperatively. However, no infant should be operated on without a "cut-down" site available for the administration of fluid and blood to combat shock. Blood should be available in the amount of 20 ml. per kilo of body weight, to be given during operation if needed. If a combined abdominoperineal or perineal approach is anticipated by the surgeon, the cut-down site should be in the antecubital area. In cases diagnosed or seen late, signs of obstruction are likely to have complicated the picture. Nasogastric suction should be instituted in these patients prior to operation. All material aspirated should be measured and taken in account in the postoperative management of fluids. In general, one may safely replace this aspirated fluid with normal saline solution in addition to the calculated fluid volume for a 24-hour period.[3] In those cases where an external fistula exists, an attempt should be made for thorough cleansing with normal saline. This is best done with a catheter of suitable size for the fistulous tract. The meconium can be considered aseptic for 24 to 48 hours and no antibiotic to combat gastrointestinal infection need be given preoperatively. Conversely, in late cases, it is desirable to give a broad-spectrum antibiotic 24 to 48 hours prior to operation. With the use of a suitable antibiotic one can gain not only adequate gastrointestinal tract sterilization but also have adequate systemic protection against infections. All patients should be sent to the operating room with an indwelling catheter in the urinary bladder.

OPERATIVE APPROACH

The operative technic for imperforate anus has been well documented in discussions of congenital abnormalities of the rectum to which the reader may refer.[1,4] In view of this, we will avoid operative details and discuss the operative approach.

The average qualified general surgeon may not be called upon to treat more than a few such patients in a lifetime. As a result, although technically capable, he may err in selecting the surgical approach.

In our experience, too many patients have been operated on from the perineal route alone and too many colostomies have been done. Although both approaches are logical, the condition of the patient should dictate the choice of approach. Colostomies should be reserved for the poor-risk premature infant and for those with other congenital abnormalities of a more serious nature that take operative preference over the rectal lesion. When a colostomy is done, we suggest that it be in the left transverse colon rather than in the sigmoid area. If a genitourinary fistula is present, the bowel should be transected and the ends widely separated to prevent spillage of bowel content in the lower segment, thereby reducing the chance of urinary infection. Sigmoid colostomies may seriously interfere with the rectal pull-through when the definitive procedure is performed. This complication prolongs the operation and is an added risk to the patient. Case 12 in our group presented this difficulty. The bowel had prolapsed and had to be resected in order to complete the perineal procedure; this possibly accounted, in part, for the cardiac arrest and the patient's death.

The perineal approach is a very satisfactory one but should be used only after the problem has been well analyzed. It is suitable for the imperforate anal membrane, low rectal pouches lying within 1 and not more than 2 cm. of the skin, short perineal fistula, and low rectovaginal fistula. We believe that in every instance where the success of this procedure is in doubt, it should be decided preoperatively whether or not the patient can stand the combined procedure if necessary.

The combined abdominoperineal operation should be used where the rectal pouch ends blindly 2 cm. or more above the skin. It should be used in practically all recto-urinary fistulas and in high rectovaginal fistulas. It is also necessary in cases where the anus and anal pouch are normal and the rectal pouch ends blindly in the hollow of the sacrum.

If these principles are followed and executed with meticulous technic, the results of the correction of this congenital anomaly should continue to improve. The margin of error in performing this operation is small, but the procedure must be done correctly the first time if a good result is to be obtained.

POSTOPERATIVE MANAGEMENT

Antibiotics should be administered for from 7 to 10 days postoperatively. During the first 24 to 48 hours fluids are given intra-

vascularly and the intravenous drip is continued in event of shock. We found in our series that aspiration is a serious complication, having occurred in 3 of 12 patients. We would advise nothing by mouth for 36 hours, at the end of which time the infants have usually recovered fully from the anesthetic. The first few feedings should always be sterile 5 percent dextrose in distilled water, so that in the event of vomiting and resultant aspiration the danger of chemical pneumonitis is less than with a milk formula. Adequate sedation is mandatory in the immediate postoperative period to prevent struggling and straining which may break down the surgical correction.

An excellent formula to begin these infants on is one made of one-half part skimmed milk plus one-half part whole milk with 18 percent carbohydrates added. This gives a low fat and high carbohydrate, high protein feeding that will be more conducive to soft stools.

When the perineal suture line is well healed, cautious rectal dilations should be instituted, if necessary. These are continued until such time as an adequate function is ensured. The mother can be instructed in digital dilatation of the rectum, to be done at least three times weekly. Throughout the first year of life the condition of these infants should be followed by both the surgeon and pediatrician working in close accord. Careful attention should be given to diet and nutrition. Perhaps the most important single factor in management is the avoidance of constipation. When fecal impaction occurs in these patients, it is extremely difficult to cope with. One of our patients had an impaction so severe that surgical removal of the feces via an abdominal approach was necessary. None of our cases have been followed long enough to evaluate the anal function. However, we believe it important to caution the parents that there probably will be much to be desired in anal sphincter control.

SUMMARY

Congenital imperforate anus, in most cases discovered in the first few hours or days of the infant's life, should be surgically corrected as early as possible. The presence of other anomalies such as rectovesical or recto-urethral fistula, as well as defects in development in other parts of the gastrointestinal tract, should be ascertained preoperatively by clinical and roentgenographic examination.

The operative approach and pre- and post-operative management should be dictated by the number and types of anomalies encountered and by the age and condition of the patient. Postoperative follow-up should continue for at least a year, and should include measures to prevent fecal impaction. Conclusions

drawn from a series of 12 cases reviewed by the authors have been presented, with the aim that they will be of some aid to the military surgeons who will ever increasingly be called upon to manage these types of lesions.

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TREATMENT OF PSYCHOSOMATIC DISORDERS

Every patient coming to a physician with complaints has usually interpreted them to himself in terms of specific organic pathology. He, therefore, expects a certain amount of history taking, a complete physical examination, appropriate laboratory studies, and a prescription. In the initial interview of one and one-half hours, the amount of time to be devoted to history taking and physical examination can usually be determined by the experienced clinician after the first 10 to 15 minutes. By that time, his impressions as to whether the patient's symptoms are predominantly organic or emotional in origin have been formed. In the event of frank organic disease or a diagnostic problem, a detailed medical history and physical examination is essential, and may well utilize all the allotted time. In the case of a patient with symptoms which appear to be predominantly emotional in origin, the same complete study should be carried out, but had best not be attempted in the one and one-half hours allotted to the initial interview. It is of primary importance to this situation that the latter patient be encouraged to speak freely at the first meeting, express his anxiety about his symptoms and what he thinks is the matter.

—HERBERT I. HARRIS, M. D., and
CAREY M. PETERS, M. D.
in *American Practitioner and Digest of Treatment*
p. 161, Mar. 1954

EPIDEMIOLOGIC INVESTIGATION OF DIARRHEA OUTBREAKS

B. DIXON HOLLAND, *Colonel, MC, USA*
OTTO C. YENS, *Lieutenant Colonel, MC, USA*

THE OCCURRENCE of common diarrhea among the patrons of a mess may be likened to the presence of coliform organisms in milk: neither is in itself serious but both indicate serious conditions which may give rise to disease of tremendous importance. It is for this reason that we believe it worthwhile to investigate thoroughly every outbreak of even mild diarrhea that is of sufficient magnitude and that occurs under such circumstances as to direct suspicion against a common mess. The importance, particularly in military life, of scrupulous attention to all phases of sanitation is universally acknowledged, for the dire consequences attending neglect of sanitation have made history.[1] However, it is human nature to become lax in the application of protective measures against any perennial danger, particularly so long as it is considered not to be imminent, whether it be the danger of attack by an aggressor nation or the danger of an epidemic of smallpox or other disease. Just as "sword clanging" by a would-be aggressor prompts us to look to our defenses, so should the occurrence of common diarrhea traced to a mess stimulate us to effect and maintain those improvements in the sanitation of this mess that are required for protection against more serious disease. It is the purpose of this article to describe a system of epidemiologic investigation, tried and proved useful in the military situation, for identifying in diarrhea outbreaks not only the offending mess but also the offending meal and food item, thereby dramatizing the consequences attending breaches of sanitation and pointing the way to necessary correction.

This article is not written for the epidemiologist or the preventive medicine company. It is written for the physician in military service who is not an epidemiologist and who has not had postgraduate study, training, or experience in preventive medicine, but who, when confronted with an outbreak of common diarrhea among a military population that patronizes a common mess, is obliged—or ought—to undertake an epidemiologic investigation to discover the cause of the outbreak and to point

From Headquarters, Southern Area Command, United States Army, Europe. Colonel Holland is now assigned to the Office of the Surgeon, Aberdeen Proving Ground, Md.

the way to correction of the breach of sanitation. Diarrhea occurs so frequently and is so widespread in the military service that it would be impossible, if indeed desirable, to have every outbreak investigated by a specialist.

The system described in this article has been worked out through application in several diarrhea outbreaks in U. S. Army and Labor Service units in Munich, Germany, over the past few years. We found that, for efficiency and to save time for the investigating personnel and for the company under study, numerous details had to be attended to simultaneously. Full use had to be made in each outbreak of lessons learned and technics developed in preceding outbreaks. Thus, we developed a check list of things to be done, forms to be reproduced, persons to be contacted, et cetera, lest some detail be lost from sight and doom the investigation to certain failure, or obstruct and greatly prolong it. This article consists essentially of the presentation of this check list, with a brief discussion of each step and explanation of the relatively simple statistical calculations required to identify the offending food item in those instances when this cannot be done with the required certainty through simple inspection of the catalogued and compiled entries from the individual questionnaires and food sheets. It is our hope that physicians in the military service will not simply read this article, then lay it aside and be unable to find it again, but that they will use it to guide their epidemiologic investigations when confronted with an outbreak of diarrhea.

The essential steps in this system of epidemiologic investigation are presented in their proper chronological order in italics, and those requiring further explanation and discussion are treated in the order of their appearance. Where needed, sample forms and statistical tables illustrate the steps. To achieve greater reality in presentation, this system is applied to an imaginary outbreak of diarrhea in a mythical "Company B" ("Baker").

PROCEDURE FOR INVESTIGATION

On Saturday morning at 0800 hours several men of Baker Company appear at sick call with the chief complaint of diarrhea.

1. The medical officer in charge of the dispensary, hereinafter referred to as "the surgeon," questions patients to determine whether there is really an outbreak and, if so, to learn the approximate hour of onset in the first case.

In outbreaks of mild diarrhea, relatively few of the men affected report on sick call. Unless the surgeon has a sufficiently high index of suspicion to make inquiry, he might fail to learn that an outbreak has occurred. Any outbreak of diarrhea, regardless of its mildness and limited extent, should be investigated

to identify and correct the deficient sanitation in the mess which caused the outbreak and which, if long uncorrected, could promote the spread of more serious food-borne disease.

2. The surgeon telephones the Commander of Baker Company to arrange to have the entire company available, starting at 1000 hours, for questioning; to get men from the company to help with the questioning; and to arrange for an immediate inspection of the mess.

If only Baker Company men have experienced diarrhea, it will probably be found that this company operates its own mess and messes separately.

It is of the utmost importance to question as many men of the company as possible—those "not ill" as well as those "ill" (these terms are used in their epidemiologic and not necessarily their clinical meaning). "Well" and "not ill" are used interchangeably, as are the terms "ill" and "case." Suppose, for instance, that the vehicle for the offending micro-organism was a pudding, which was eaten by most of the men in the company, for example, 90 per cent. If only 40 men were interrogated, 20 of them from among those ill and 20 from among those well, it might well happen that none of the 20 ill men failed to eat the pudding and that only 4 of the 20 well men failed to eat it. (Note that in this group of 40 men, 36, or 90 per cent, ate the pudding and 4, or 10 per cent, failed to eat the pudding.) This looks like pretty strong evidence against the pudding, but it can be shown by the chi-square test (described later) that the association between eating the pudding and getting sick in this particular group is not a statistically significant association. Suppose, however, that instead of interrogating 40 men out of the company we interrogated 200 men and found that among 80 ill men in the group none had failed to eat the pudding, while of the 120 well men there were 20 who did not eat it. (Here again 90 per cent of the men ate the pudding and 10 per cent failed to eat it.) We would now have valuable evidence to incriminate the pudding, because it can be shown by the chi-square test that there is in these data a highly significant association, statistically speaking, between eating the pudding and becoming ill. Unless some other explanation is found to account for this association, the evidence indicates the pudding as the source of the outbreak.

The investigation must keep the men of the company away from their duties for as short a time as possible. Also, the sooner the interrogation is undertaken, the more reliable will be the answers. For these reasons, men of the company are used as interviewers. If a good questionnaire is developed, like that illustrated in figure 1, and if men of average or higher intelli-

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"M" Mess (mess at which the group struck by the outbreak ordinarily eats and/or presumably ate during the incubation period of the disease featuring in this outbreak).

"S" day (date on which symptoms first appeared in the first case properly classed *as a part of this outbreak,* not a coincidental case).

INSTRUCTIONS: Use 24-hour time, *e. g.,* 0900 for 9:00 a. m.; 1500 for 3:00 p. m. Question every individual regardless of whether he is sick, has been sick, or remained well. Be sure he understands each question. If he IS NOT SICK or WAS NOT SICK, delete by diagonal lines and omit question 3 to 7 inclusive and question 12.

1. Questionnaire filled out on_____, 19_____ at hour_____

2. _____
(Last name) (First name) (ASN) (Unit)

3. Place an X after each of the following symptoms suffered:

Sick at stomach_____ Bowels loose_____ Shaking chills_____
Vomiting_____ If so, state number of movements___ Belly gripes or cramps___

4. Other symptoms (list them)_____

_____

5. Which symptom appeared first?_____ Exact hour and date_____

6. Did your sickness begin suddenly?_____ Was it severe?_____

7. Are you still sick?_____ If not, how many hours were you sick?_____

8. State hour at which you ate each of the meals you had at "M" Mess on_____, 19_____ ("S" day)

Breakfast_____ Dinner (lunch)_____ Supper_____

9. Indicate by an X in appropriate space which of the meals you had at "M" Mess on_____, 19_____ (the day before "S" day).

Breakfast_____ Dinner (lunch)_____ Supper_____

10. Indicate by an X in appropriate space which of the meals you had at "M" Mess on_____, 19_____ (the day before the day before "S" day).

Breakfast_____ Dinner (lunch)_____ Supper_____

11. Indicate by an X in appropriate space which of the meals you had at "M" Mess on_____, 19_____ (the day after "S" day).

Breakfast_____ Dinner (lunch)_____ Supper_____

12. Did you eat at any place other than "M" Mess during period_____ to _____, 19_____ ("S" day, the day before "S" day, and the day before the day before "S" day)? If so, indicate below where you ate, what you ate, and at what time:_____

_____

REMARKS (Indicate to which question each refers) (Continue on reverse side):

_____

_____
(Signature of interviewer)

Figure 1. Individual questionnaire for investigation of diarrhea outbreak.

gence are used as interviewers and instructed beforehand in the use of the questionnaire, data can be obtained as reliable as the trustworthiness and memory of the men interviewed will permit.

To ferret out the cause of an outbreak and to determine the manner in which it operated, it is necessary to identify as many as possible of the ill persons who form a part of the outbreak in question. It is more important that no man be listed as ill when he is not than that every ill person be listed. For this reason, gross symptoms—for example, vomiting, diarrhea, and cramps—are inquired into by means of the questionnaire. Lay interviewers, making use of questionnaire forms worded in simple, readily intelligible language, can after brief instruction elicit fairly reliable answers as to gross symptoms experienced. As a further safeguard against including "false positives" as ill patients, incontrovertible criteria, such as passage of two or more stools or vomiting, are set up for determining who of the men are ill. Such qualifying criteria will, of course, miss patients with mild but epidemiologically bona fide illness—for example, those with only nausea or abdominal cramps. However, these safeguards will tend to prevent including as ill those men who, by the power of suggestion, might report as symptoms of sickness such physiologically normal phenomena as hunger pains, borborygmi, and postprandial gastrocolic reflex.

If one is obliged to choose between a small number of questionnaires carefully completed by physicians or other medical experts and a much larger number of questionnaires less accurately completed by hastily recruited and trained lay assistants, one should elect the latter, at least when one is dealing with a diarrhea outbreak, because it is necessary only to be sure that every man listed as ill really is ill, and to learn which items of food every man in the study ate. These conditions can be fulfilled through observing the precautions outlined in this article.

3. The surgeon makes the necessary changes in the questionnaire, as illustrated in figure 1, to adapt it to serve a particular outbreak, and has sufficient copies reproduced.

4. The surgeon contacts the laboratory and requests necessary culture media and service.

It is suggested that enough tubes and plates of media be obtained to culture 30 specimens, half of them for pathogenic gram-negative enteric bacilli, and half for gram-positive cocci.

5. The surgeon dispatches a messenger to pick up the culture media.

6. The surgeon then proceeds to the mess to learn certain things about the composition and preparation of meals served during the "period of greatest probability" (explained below) and to conduct a sanitary inspection.

The following are some of the things he does:

(a) Requests that any leftover food be placed in the refrigerator and left there, untampered with, until the surgeon indicates other disposition.

(b) Inspects the master menu for each meal served in the mess during the "period of greatest probability."

(c) Writes down the ingredients (particularly leftovers) that went into each food and beverage served at each meal during this period; when and how each food and beverage and their ingredients were prepared and handled; how long each of these items was left unrefrigerated after, or at any time during, its preparation; and any other information that might give a clue as to the possibility of pathogenic micro-organisms from human or animal sources being implanted on, or allowed to propagate in, any food or beverage or any ingredient thereof.

(d) Inquires carefully if any "extra" item of food or beverage was served at any meal during the period in question either as a substitute for, or supplementary to, foods and beverages listed in the master menu. Writes down the required detailed information for each such "extra" item.

(e) Records the identity of each person who in any way took part in preparing or serving any food or beverage served during this "period of greatest probability" and causes each such person to be subjected to such interrogation and physical and laboratory examinations (see step 13 below) as may be necessary to determine if at the time he engaged in handling any of these foods or beverages he could have carried the micro-organism of the disease featured in the outbreak.

(f) Records details of any sanitary deficiencies which he learns occurred in the mess within the past several days, *e. g.*, interruption of refrigeration, lack of hot water, lack of soap or other detergent, prevalence of flies or vermin, et cetera.

(g) Conducts a thoroughgoing sanitary inspection of the mess and premises, checking particularly such things as the temperature of the dish water; the temperature and cleanliness of the refrigerator and the condition of its contents; methods of preparing and serving food; prevalence of flies; signs of rats, mice, roaches; and personal hygiene practices on the part of food handlers.

The "period of greatest probability" is that period which, immediately preceding the hour of onset of symptoms in the first case of the outbreak, is as long as the median incubation period of any disease which is likely to be causing this outbreak. Care should be taken to avoid the mistake of reckoning the onset of the outbreak on the basis of a case which might be *coincidental with,* but *not a part of,* the outbreak. Unless the outbreak is clearly staphylococcus toxin food poisoning, one should, to be on the safe side, make this "period of greatest probability" cover about 30 hours, because this is as long as the median incubation period of salmonella infections and is longer than the incubation period of the diarrhea most commonly observed in the Army (the variety that we have in mind fits most closely Dack's[2] description of streptococcus food poisoning). To illustrate: If the first patient detected in the outbreak became ill around 2000 hours on Friday, one should consider the "period of greatest probability" to include breakfast, dinner, and supper Friday, and supper Thursday.

7. The surgeon then has food sheets made and reproduced like that illustrated in figure 2.

Outbreak beginning on _____ *19* ____ *among patrons of mess of* _____

Foodsheet No.		Individual items of food and beverage for "period of greatest probability"				For 24-hour period preceding "period of greatest probability"			
Name of person	No.	First meal	Second meal	Third meal	Fourth meal	First meal	Second meal	Third meal	Fourth meal

Figure 2. Food sheet for investigation of diarrhea outbreak.

Findings obtained through step 6 guide the preparation of the food sheets and dictate which items of food and drink are to be entered in its headings. Across the top of the sheet are listed the individual foods and beverages (grouped by meals) served during each meal in the "period of greatest probability," and merely the name of each meal (not items served) for 24 hours preceding that period. It is of the greatest importance that all foods and ingredients be listed which are likely to serve as the vehicle for diarrhea-producing micro-organisms. Other foods such as bread, sugar, black coffee, sugar syrups, dry cereals,

et cetera, need not be listed except when they merit suspicion in conjunction with other food. For instance, where appropriate, instead of listing "coffee," list "cream (in coffee)," and instead of listing "canned peaches," list "whipped cream (on canned peaches)."

8. The surgeon next organizes his staff, including the men lent him by Baker Company, into two interviewing teams, one to complete the individual questionnaires, illustrated in figure 1, and the other to complete the food sheets, illustrated in figure 2.

9. The surgeon then thoroughly instructs the interviewers.

He reads and explains to them the entries in the forms and impresses them that they must ask each question carefully, and must make sure that each man interviewed answers as accurately as his recollection permits, to make it possible to classify all men as "ill" or "well" (in the epidemiologic sense) and to learn which items of food and drink each man consumed.

10. The surgeon arranges to have rooms fitted out to serve for the interviewers, with a table and two chairs for each interviewer. Those filling out the individual questionnaires should operate in a room separate from those filling out the food sheets.

11. As groups arrive to be interviewed, each should be under the control of a company noncommissioned officer, who directs the men quietly to enter one or the other of the interview rooms when required, and to go to the next room for the second interview when finished.

It does not matter which interview is done first. Any person whose answers to questions 8 through 10 indicate that he has not eaten a meal at the mess during the period covered by the questionnaire is promptly dismissed and excluded from the study. However, of the group that did eat a meal at the mess during this period, both ill and well persons have to be subjected to both interviews.

12. The surgeon supervises the interviewing while it is in progress, to ensure that the proper questions are asked and answered in the correct manner, and that the entries are correctly written.

13. The surgeon selects typical patients and suspected mess personnel for bacteriologic examination of their stool specimens.

The contributions made by the laboratory toward determining the causative organism in "run-of-the-mill" diarrhea outbreaks vary greatly. Generally, the laboratory results are disappointing, possibly because the offending organism is so often ubiquitous

and indistinguishable culturally from nonpathogenic members of the group to which it belongs. Another possible reason is that an insufficiently wide assortment of culture media are used to isolate and identify every possible offending organism, whatever be the group to which it belongs. For instance, media which would promote the growth and identification of bacteria of the salmonella group might not support the gram-positive cocci, and vice versa. Often to blame is lack of sufficient competence and interest on the part of personnel taking and handling specimens and on the part of laboratory personnel examining them.

The evidence incriminating a particular food as the cause of an outbreak of diarrhea is generally at best circumstantial, but the greater the volume and reliability of such evidence, the better. The proof that the suspected item of food caused the outbreak is satisfactorily established by finding a diarrhea-producing organism in that food, the same organism in the stool, secretions, or lesions of a person known to have handled that food and in the stools of persons known to have eaten that food. However, less substantiating evidence will do. The *sine qua non* for incriminating a food is *not* that it be found to contain a diarrhea-producing organism, *nor* that this organism, if found in the food, also found to be harbored by a handler or consumer of the food. The *sine qua non* is that it be shown that none became ill who did not eat the suspected food and that all who became ill ate the suspected food. It is not necessary to prove that all who ate the food became ill, inasmuch as individual persons vary in susceptibility, some will eat more than others, and the causative organisms may be so dispersed in the mass of food that not every serving will contain them, or enough of them to produce disease. The epidemiologic investigation, therefore, can yield findings which, unsupported by laboratory findings, can indicate which item of food caused the outbreak. This investigation can at times also indicate the identity of the offending organism, how and by whom it was implanted on the food, and how, once implanted, it was able to multiply.

14. In order to facilitate the study, the surgeon has the food sheets attached together to make one long sheet or series of long sheets.

15. The surgeon then studies Baker Company's completed questionnaires and classifies each man as "ill," "not ill," or "questionable."

The severity of illness, as mentioned before, is unimportant for epidemiologic purposes. Clinically questionable cases will occasionally be observed which defy hard and fast classification. Such cases should be excluded from the study, their names and food data crossed off the food sheets, and their questionnaires removed from the others.

Having once classified a man, the surgeon must not change his classification, however strongly tempted by later findings to do so. An example would be his classification as ill of a man who reported not having eaten the food most strongly suspected of causing the outbreak. Such a discrepancy might be attributed to one of two things: that the man answered incorrectly deliberately, or because he did not understand the question, or because his memory did not serve him right; or that his was a coincidental illness and not epidemiologically a case belonging to the outbreak. Such cases which patently do not fit the pattern can, in fact, rightly be considered and reported as not belonging in the outbreak, provided care is taken to avoid bias. In other words, incorrect replying should not be assumed expressly either for the purpose of incriminating or exonerating a particular food. Furthermore the number of ill persons labeled "coincidental" cases should not be greater than corresponds to the "normal" incidence of the disease (in this study, diarrhea) among the group. In other words, out of an American company located in Germany, for example, one or even two endemic cases of diarrhea can be expected to occur, on the average, every day, including the day on which an epidemic of diarrhea occurs. But it would be bias to label five cases as "endemic," that is, "coincidental," merely in order to avoid weakening the evidence against the food most strongly suspected of causing an outbreak.

16. The surgeon numbers each man according to his place on the combined food sheets and enters this number on the man's questionnaire. A red "X" is entered in the upper right-hand corner if the man is classified 'ill,' and no mark if he is classified "not ill."

17. The surgeon then has each "ill" man's name on the food sheet underlined in red, and a red mark drawn through each 'X" mark that indicates an eaten food in the food-item list opposite his name. The hour that each man became ill is entered above his name on the food sheet.

18. The surgeon then makes preliminary inspection of the food sheets to learn, if possible, which items and meals should be considered as most likely to have caused the outbreak.

19. The surgeon again contacts the mess.

Having drawn up a list of suspected food items on the basis of his preliminary inspection of the food sheets, he sends his sanitary inspector with this list to the mess to learn which, if any, of such items are among the leftover foods which the surgeon requested be saved; to bring back samples of any found; and to release for proper disposition any leftovers not under suspicion.

20. The surgeon initiates necessary laboratory work.

He causes the inoculation into the proper media of specimens of the following: available leftover suspected foods; stools from selected typical cases; and stools and swabbings from the throats and suspicious skin lesions of suspected food handlers. He has the plates and tubes properly labeled, and directs these, as well as gross specimens of any suspected leftover foods, to be properly packaged, labeled, and transported without undue delay to the hospital laboratory.

21. The surgeon then conducts as thorough a study, including statistical analysis of available data, as is required to identify conclusively the meal and the food item causing the outbreak.

He inspects the food sheets in order to exonerate nonoffending meals and to incriminate the offending meal and food in accordance with the following criterion: A food or meal can be considered responsible for the outbreak if everyone classified as "ill" reported having eaten it, while a substantial proportion of the group classified "not ill" reported having not eaten it.

At times a simple inspection of the food sheets will serve to exonerate certain *meals,* in that it shows that a substantial proportion of the men who became ill reported not having eaten these meals. By similar evidence, certain *foods* are exonerated. However, there is often one meal, and occasionally even one food in that meal, which fulfills—and stands out alone as fulfilling—the stated criterion. If this is the case, the surgeon is justified in considering that meal or food item to be the cause of the outbreak. More frequently no particular meal or food that completely fulfills this criterion can be found through simple inspection of the food sheet entries. Often exceptions will be found that on the surface invalidate the "perfect" evidence against a particular meal or food. For example, some persons classified as "ill" may report *not* having eaten it. Sometimes by interrogation and investigation it can be shown that some or all of these persons appearing to be exceptions actually had coincidental cases of diarrhea, not cases belonging to the outbreak. Faulty memory, or deception, or incorrect asking of the question may have caused a person to state that he did not eat the suspected food when in reality he did eat it. As previously explained, however, definite precautions must be taken in making these excuses lest bias be introduced into the study.

In the criterion as stated, it is postulated that a "substantial" proportion of the group classified "not ill" did *not* eat the food item. Obviously, if everybody ate a particular item of food there would be no basis for comparison between ill and well men with respect to eating this item, and it would therefore be impossible to adduce statistical evidence sufficient to incriminate this item.

Up to this point, no statistical treatment of data has been required except counting "ill" and "well" persons, and persons eating and persons not eating each of the meals and each of the several items of food. If, however, no one meal or food item is found to satisfy the criterion, the surgeon must test the soundness of his opinions and conclusions—that is, subject to statistical scrutiny and testing the data on which such opinions and conclusions were based.[3] There is a very simple test, namely, the chi-square test,[3,4] which is suitable for use in connection with the epidemiologic investigation of the type of outbreak under discussion.

EXAMPLE OF USE OF CHI-SQUARE TEST IN CONNECTION WITH THE EPIDEMIOLOGIC STUDY OF A DIARRHEA OUTBREAK

Number of men interviewed 300
Of whom there were classified "ill" 200 (2/3 of 300)
Of these same 300, the number eating pudding was 270 (9/10 of 300)

If eating pudding had nothing to do with causing illness		*However*
"Expected" findings would be that:		*"Observed" findings* were that:
Of the "ill" men, numbering	200	
9/10 ate pudding, or	180	195 of the 200 "ill" men ate pudding
1/10 did not eat pudding, or	20	5 of the 200 "ill" men did not
"Expected" proportion	Eaters 180 / Total 200	195 Eaters / 200 Total "Observed" proportion
Of the pudding eaters, numbering	270	Of the 270 pudding eaters:
2/3 became "ill," or	180	195 became "ill"
1/3 remained "well," or	90	75 remained "well"
"Expected" proportion	Ill 180 / Total 270	195 Ill / 270 Total "Observed" proportion

The differences between corresponding "expected" and "observed" proportions in the above illustration are of such magnitude as to raise a question as to the validity of the hypothesis that eating pudding had nothing to do with causing illness. The chi-square test would be useful in testing this suspicion, through determining the statistical significance of these differences. This test yields a value for chi-square for which there can be found in statistical textbooks[3,4] the value for the corresponding "P" (tables 1 and 2). "P" means "probability" and is a measure of the likelihood that chance alone accounts for the differences seen between corresponding "expected" and "observed" proportions. The smaller the "P," the less this likelihood. In the example above, the chi-square (with Yates' correction) is 35.04, for which the corresponding "P" is *less than* 0.005. This is well within the range of "P" (0.05 and less), to which statistical significance is ordinarily attributed. However, a "P" within the range of statistical significance does not mean that chance did *not*

account for the difference from which the "P" was derived. It only means that a cause-and-effect relationship should be postulated between the events in question (*e. g.*, eating pudding and becoming ill) unless and until shown to be untenable on the basis of good and sufficient evidence.

TABLE 1. *"Four fold table" using the statistics from the example of use of chi-square (x^2).*

	Ate	Did not eat	Total
Ill	a 195 (180)	c 5 (20)	a+c 200
Not ill	b 75 (90)	d 25 (10)	b+d 100
Total	a+b 270	c+d 30	a+b+c+d 300

Numbers in parentheses are "expected" findings.

2. Formula for computing x^2:

$$x^2 = \frac{(ad-bc)^2 (a+b+c+d)}{(a+b)(c+d)(a+c)(b+d)}$$

3. Where there are small numbers, use the following formula (with Yates' correction):

$$x^2 = \frac{(|ad-bc| - \frac{1}{2}(a+b+c+d))^2 (a+b+c+d)}{(a+b)(c+d)(a+c)(b+d)}$$

(The symbol $||$ means the absolute value.)

TABLE 2. *Table of conversion of* x^2

x^2	P	x^2	P
.000157	.99	1.074	.30
.000628	.98	1.642	.20
.00393	.95	2.706	.10
.0158	.90	3.841	.05
.0642	.80	5.412	.02
.148	.70	6.635	.01
.455	.50	7.85	.005

If for several foods "P's" are found by the chi-square test which are within or near the range of statistical significance, *i. e.*, 0.05 or less, consideration must be given to the possibility

that the causative agent might be a "common denominator" ingredient, *e. g.,* milk, common to several or all of the foods for which such "P's" were found. If, for example, the "P" found for coffee cream in a particular outbreak is less than 0.05, then the "P's" for other suspected items of food should be computed. Such values of "P" would be well within the range of values explainable by chance alone, most likely between 0.20 and 0.80, *unless* the same cream, or the milk from which it was taken, was served as a part of other foods or in other forms than as coffee cream. This happened in one outbreak studied by the authors, and a chi-square test was run on the basis of the observed difference between two proportions, namely, the proportion of the ill group constituted by consumers of milk or cream *in any form,* and the proportion of the well group constituted by consumers of milk or cream *in any form*. This chi-square test gave a "P" definitely within the range of statistical significance and showed that the "common denominator" was milk or cream in whatever form it was served. For the *non-milk-or-cream-containing* assortment of foods a "P" of 0.23, or 1 in 4, was obtained, which is well within the range explainable by chance alone. Thus, through actual computation the authors refuted the anticipated argument that for *any other* assortment of foods there might have been obtained as good a "P" as was obtained for the milk-or-cream-containing foods as a group.

If, however, the "P's" for several items of food are found to be within or near the range of statistical significance and yet no "common denominator" food ingredient is incriminated, consideration must be given to the possibility that as the result of improper sterilization the utensils in which these foods were prepared or served may have contaminated these foods with the causative organism.

The surgeon is not expected to be a statistician. He has merely to make a table like the one illustrated in table 1; enter in it the values for a, b, c, and d; and turn the table with these values and the chi-square formula over to any one who knows what the simple algebraic expressions mean and who can add, subtract, multiply, and divide. This person could then derive the value of chi-square, for which the surgeon could then find the corresponding "P" in the table in table 1 or in a textbook of statistics.[3,4] The use of a calculating machine, although not indispensable, would materially facilitate the mathematical computations and ensure greater accuracy. If the surgeon finds that more "formidable" statistical procedures are required, he should consult a statistician. There is probably one in the office of the surgeon of the next higher headquarters.

If the surgeon finds one meal only, and/or one food item only, for which the chi-square test gives a "P" of 0.05 or less, he

can, with reasonable assurance, incriminate this meal and/or food as the source of the outbreak. The same is true for any "common denominator" food ingredient.

If for no food or beverage item a "P" within or near the range of statistical significance is found, the surgeon checks the chi-square formula on each of the meals for the 24-hour period preceding the "period of greatest probability."

If for any one of the meals served during the 24-hour period preceding the "period of greatest probability" the chi-square test yields a "P" within the range of statistical significance, that meal can be incriminated. In this event it might be well to recall a sufficiently large "sample" of ill and well members of Baker Company to ask them which of the individual food items they ate at that meal. The master menu for that meal should be studied and such information should be elicited for that meal as was elicited through the mess inspection in step 6 for the meals served during the "period of greatest probability." In the absence of detailed food sheet entries for the incriminated meal, the story concerning the preparation and handling of food served at this meal may yield presumptive evidence against one particular item of food.

22. If studies to this point have turned up anything which should form the basis of "stop-gap" instructions to Baker Company, the surgeon issues such instructions to the company commander or his designated representative.

23. The surgeon then writes to the appropriate commander a special sanitary report of this outbreak with recommendations for corrective action and prevention of future outbreaks.

He should use language easily understood by a layman.

He should state such of the following as is applicable and determinable: Time of the outbreak; its magnitude in terms of percentage classified as "ill" out of the group interviewed; the fact that only the one company was affected, and that this company operates its own mess and that no other unit messes with it; the clinical picture of the typical case and roughly the proportion of mild, moderately severe, and severe cases; the meal and food item incriminated as the cause, with a brief account of supporting epidemiologic and laboratory findings; and any positive findings made on inspection of the mess, study of the master menus, interrogation and examination of food handlers, et cetera, which might indicate faulty mess sanitation or food handling practices.

24. The surgeon includes a copy of this special sanitary report and refers to it in his next monthly sanitary report.

SUMMARY AND CONCLUSIONS

The system of epidemiologic investigation described herein has been found, on trial, to be effective in identifying the offending item of food and discovering and pointing the way to the correction of the sanitary deficiency at fault in outbreaks of common diarrhea in military units. This system is characterized by the use of untrained personnel for the collection of statistical data and by statistical analyses so simple that they can be carried out successfully by medical officers who have little or no experience in epidemiology. Only a few hours' time is required for interviewing an entire company, and because the men are brought to the interview in increments no man need be kept from his duties more than an hour. It is possible to so organize and process the groups as to occasion little loss of company training or duty time.

It is believed that this system, with some modifications, would prove useful also in investigating diarrhea outbreaks attributable to a common mess in other "captive" groups, such as inmates of a prison or eleemosynary institution, or groups who could be readily reassembled for interviewing, such as patrons of a banquet or church supper and, under certain circumstances, the customers of a restaurant. It is further believed that this system could be adapted for use in the investigation of outbreaks, among such groups, of food-borne diseases other than common diarrhea.

This article does not attempt to offer a course in epidemiology, supplant the epidemiologist or the preventive medicine company, or advocate that the system of epidemiologic investigation described be employed indiscriminately. Rather it is intended to advocate the application of this system in any food-borne disease outbreak in which circumstances will permit or warrant its use.

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THE VIABILITY OF TRANSPLANTED EPIPHYSEAL CARTILAGE

WILLIAM F. MacDONALD, *Major, MC, USA*
ROBERT J. BARNETT, *Lieutenant Colonel, MC, USA*
ERNEST A. BRAV, *Colonel, MC, USA*

IN SPITE of voluminous clinical and experimental research in the past century considerable doubt remains concerning the viability of transplanted bone.[1-6] There is also uncertainty as to whether or not growing epiphyseal cartilage will survive the procedure of transplantation from one area to another or from one person to another. It is generally conceded that the cells of preserved and transplanted bone die, but differences of opinion exist concerning the value of such transplants. These questions affect our clinical thinking in regard to the type of bone grafting that is most effective and the practicality of using transplanted epiphyseal plates or complete epiphyses to compensate for delay or cessation of bone growth of an extremity. In an attempt to shed further light on these processes, a number of experiments in epiphyseal cartilage transplantations were conducted in growing dogs.

MATERIAL

The purpose of this study was to repeat the experiments of earlier workers with the addition of certain refinements not available to them. All our animals were placed on penicillin and streptomycin therapy postoperatively and the factor of wound infection was eliminated. Furthermore, the transplanted epiphyseal cartilage was firmly fixed in its new position by an intramedullary wire, thus avoiding any local motion which might have an effect on cellular viability and subsequent growth.

Twenty puppies of an average age of 8 weeks were used in these studies. There were 4 general types of experiments:

1. Removal and immediate reimplantation of an epiphyseal plate.
2. Immediate autogenous transplantation of another epiphyseal plate.
3. Immediate fresh homogenous transplantation.

From Walter Reed Army Hospital, Washington, D. C.

4. Transplantation of refrigerated and preserved epiphyseal plates.

The lower epiphysis of the radius was used in all animals, and in each case the epiphyseal plate was retained in position by an intramedullary wire. The opposite epiphyseal plate of the radius was left intact and was used for control measurements. On the operated side a needle was broken off in the metaphysis as a marker for subsequent measurement of epiphyseal growth. Preliminary studies were made on puppies to determine how much tissue required removal to eliminate the possibility of growing cells remaining and proliferating at the operative site. When this had been determined, an attempt was made in the subsequent experiments to remove all epiphyseal cartilage with as little adjacent epiphyseal and metaphyseal bone as was technically feasible. Dorsal incisions were made for exposure and only as much periosteal stripping was done as was necessary to carry out the procedure. After the operation the animals were all weight bearing without external fixation. There were no infections, but one animal died during the postoperative period. Roentgenographic studies were performed at 4-week intervals to note the appearance and state of closure of the transplanted epiphyseal plates as well as to measure the distance between the epiphyseal plates and the markers. In addition, comparison in over-all length of the radius was made with the opposite side as the control, determining by the marker whether the growth was from the transplanted epiphysis or from the one at the opposite end of the bone.

RESULTS

While the number of experimental animals was too small for any definite conclusions, the results were sufficiently consistent to warrant description. Table 1 represents a summary of the results during a postoperative period sufficiently long to be considered significant. It will be noted that where reimplantation of an epiphysis was immediately performed at its original site, the epiphysis continued to grow, although the growth was definitely retarded (figs. 1 and 2). Autogenous transplantation of epiphyseal plates resulted in no growth and early closure of epiphyseal lines. Fresh homogenous transplants and preserved frozen transplants, either autogenous or homogenous, produced no roentgenographic evidence whatsoever of cellular viability or continued cartilaginous bone growth.

SUMMARY

No conclusions can be drawn from this brief experimental study of the effects of epiphyseal cartilage transplantation. It appears to confirm, however, the extensive investigations of Haas,[1] Bisgard[2] and many others who believe that bone and bone-

TABLE 1. *Postoperative growth results of transplanted epiphyseal cartilage in 19 puppies*

Type of epiphyseal transplant	Number of puppies	Results
Autogenous plate reimplantation	3	All showed growth but only 20 to 60 percent of that of controls
Autogenous reimplantation of entire epiphysis	1	Growth 0.7 cm. but accompanied by disintegration of epiphysis
Autogenous plate transfer from another epiphysis	3	No growth
Homogenous plate transplant	6	No growth
Homogenous transplant of entire epiphysis	2	No growth
Frozen transplants, autogenous or homogenous	4	No growth

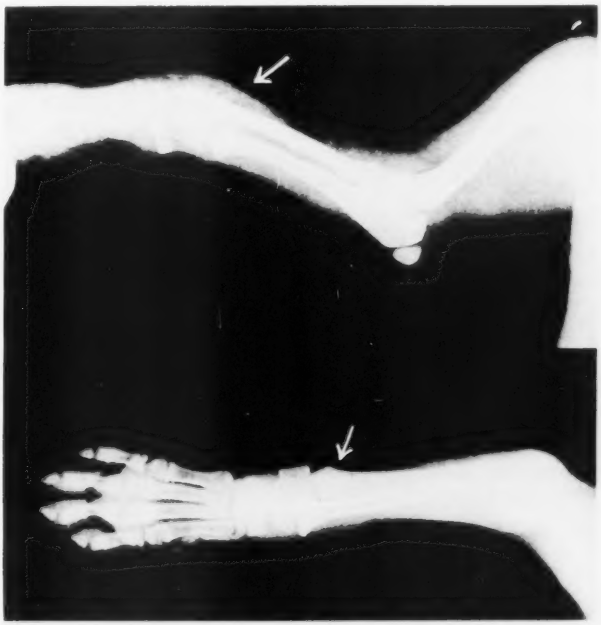

Figure 1. Roentgenogram taken after reimplantation of lower radial epiphyseal cartilage plate showing intramedullary type of fixation and metaphyseal marker for growth determination.

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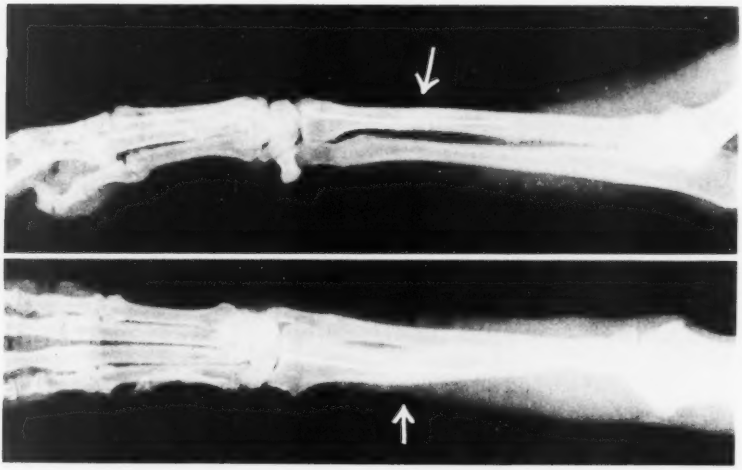

Figure 2. Roentgenogram of animal shown in figure 1, 7 months after operation, demonstrating by position of marker that growth has occurred at the reimplanted epiphyseal plate although it was only about 60 percent of the expected growth as compared with that of the opposite radius.

forming structures, when removed and replaced, do not continue their normal cellular activities and that direct reimplantation, fresh autogenous transfer, fresh homogenous transfer, and finally preserved grafts of any type show viability and growth in descending order. From these studies in growing dogs there is little encouragement for the proponents of epiphyseal plate transplantation for the purpose of improving growth potential following injury or disease.

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SURGICAL TREATMENT OF PULMONARY TUBERCULOSIS

ELMORE M. ARONSTAM, *Lieutenant Colonel, MC, USA*
JOHN B. PLUM, *Lieutenant Colonel, MC, USA*

SINCE 1947 there has been a progressive increase in pulmonary resection in patients with tuberculosis at Army thoracic centers. At this hospital, about 15 per cent of the patients with pulmonary tuberculosis undergo pulmonary resection as part of their over-all treatment. It is the mission of the Army to conserve or rehabilitate as many persons as possible for full military duty. The investment in each enlisted man and officer for his training and experience is an appreciable one, amounting to many thousands of dollars. Return of the man to duty rather than retirement obviates a considerable loss. Treatment of the person with tuberculosis, to be practicable economically and logistically, however, must not require hospitalization from a 2- to 3-year period as has been done previously.

PLAN OF TREATMENT

To this end, we have shortened the total hospitalization to a maximum of 14 or 16 months. Because clinical evidence indicates that present chemotherapeutic agents exert their maximum effect at about 8 to 10 months, we have aimed, in general, at a total period of chemotherapy of from 9 to 11 months. Adequate pulmonary resection is done somewhat early in the course of this chemotherapy (2 to 4 months) at a time when softer pneumonic components are no longer seen on the roentgenogram and after the bronchoscopic findings are normal. Following postoperative rest and drug therapy, a short period of hospital observation and leave ensues before the patient returns to duty. This plan of treatment has been applicable for the majority of our patients because most of them had only minimal or moderately advanced tuberculosis. From point of duration, they did not have old, long-standing, bilateral, advanced, fibrocavitary disease for which a longer and different approach to treatment must often be adopted.

RATIONALE OF RESECTIONAL THERAPY

The rationale for pulmonary resection in tuberculosis is based on pathologic, bacteriologic, and empiric evidence at hand today. Seven years' experience with chemotherapy has given us important

From Valley Forge Army Hospital, Phoenixville, Pa.

pathologic data. Antituberculosis drugs have been found unequivocally to resolve a pneumonic or lobular area of inflammation produced by tuberculous infection in a short time of 6 to 8 months. The behavior of the necrotic caseous component of the disease, however, is entirely unpredictable. Medlar[1] has observed, as have we, that liquefaction and sloughing can occur during, and even after, prolonged chemotherapy. Roentgenograms and microscopic observation of pulmonary lesions often give dissimilar impressions as to activity in the individual lesion. The similarity of resected necrotic caseous lesions from persons having had and from those not having had chemotherapy is striking. The unpredictability of the progress of these necrotic lesions is probably directly related to the recurrences or relapse of disease observed in patients treated with chemotherapy. Cavitary disease of tuberculosis pathologically has more ominous implications. True healing of cavities is rarely observed microscopically. In the past it has been difficult to culture *Mycobacterium tuberculosis* from necrotic caseous residual lesions removed from patients whether or not they received chemotherapy. Recently, Hobby and associates[2] by improved culture methods were able to grow *Myco. tuberculosis* in an extremely high percentage of cases. This confirms the belief held for a long time that the *Myco. tuberculosis* invariably seen on resected specimens from preoperatively proved cases are viable even after long periods of chemotherapy. That they are pathogenic for the host is probably true in a majority of instances. Not infrequently have we seen relapses in patients receiving chemotherapy for up to a year. Thus, we are extremely reluctant for these reasons to return a man with necrotic or cavitary residuals in his lungs to military duty.

METHOD OF STUDY

We have assembled pertinent data on all patients undergoing surgical intervention for proved tuberculosis. Tuberculous organisms were found preoperatively or in resected specimens from these patients. We are following them year after year to determine how they progress under our present plan of combined medical-surgical treatment. Each patient is sent yearly a detailed questionnaire about himself and his health. Those giving questionable answers concerning their health are invited back at Army expense for re-examination or, if this is impractical for the patient, the local physican or hospital is contacted for more information. Tables 1 through 3 indicate some of the pertinent results of the combined 1953 and 1954 cases.

DISCUSSION

Patients in this group are relatively young and predominantly white males. Most patients (135) had moderately advanced pulmo-

nary tuberculosis according to National Tuberculosis Association standards. A sprinkling of minimal and far-advanced cases were included (56 minimal; 15 far-advanced).

TABLE 1.

Primary operations	Number	Secondary operations	Number
Segmental resection	106	Thoracoplasty	38
Lobectomy	41	Segmental resection and thoracoplasty	1
Wedge resection	7	Segmental resection	1
Pneumonectomy (extrapleural)	1	Drainage of empyema	3
Primary thoracoplasty	1	Lobectomy	1
Decortication	4	Thoracotomy to control bleeding	3
Lobectomy and thoracoplasty	14	Closure of bronchopleural fistula	2
Segmental resection and thoracoplasty	1	Thoracotomy for wound dehiscence	1
Segmental resection and wedge resection	10	Prenemphraxis	4
Segmental resection and lobectomy	10		
Segmental resection and decortication	1		
Segmental resection, lobectomy, and thoracoplasty	3		
Wedge resection and lobectomy	5		
Wedge resection, lobectomy, and thoracoplasty	1		
Segmental resection, wedge resection, and decortication	1		
Total	206	Total	54

For the most part these were parenchymal pulmonary problems, pleural problems having been infrequent (6 decortications in the 2 years). Most patients had resections to eliminate a necrotic or cavitary residual. The indications for operation have changed little in the past 2 years. A comparison of the types of operations performed shows a predominance of segmental resections. Experience here as well as elsewhere has shown that single or multiple segmental resections can adequately remove significant caseous or cavitary residuals. In a large number of patients (26 per cent), fine gross residual disease has been left in the form of scattered tiny nodules in the remainder of the lung and mediastinal lymph nodes because one cannot resect all of a patient's tuberculous lesions. We resected the larger caseous nodules, those beyond a few millimeters in diameter, as well as the cavitary residuals,

TABLE 2. *Operative and postoperative complications*

Complication	Number
Bronchopleural fistulas	8
Persistent air leak	8
Persistent space	9
Empyema	10
Wound infection	3
Atelectasis	11
Hemorrhage	8
Pleural effusion	2
Incarcerated scapula	1
Subscapular effusion	1
Wound dehiscence	1
Postoperative pneumothorax	1
Extrapleural hematoma	2
Thrombophlebitis	1
Patients with complications	45 (22%)
Patients with no complications	161 (78%)
Total cases	206 (100%)

TABLE 3. *Follow-up of patients*

Number of patients	206	Hospitalized	
Number followed	200	Persistent bronchopleural fistula	1
Well	195	Schizophrenia	1
Recurrence or spread	0	Reactivation of contralateral disease	1
		Deaths	
		Cerebral anoxia during operation	1
		Train wreck	1

conserving as much lung tissue as possible. We have elected to explore and resect the pulmonary lesions first rather than perform a first-stage thoracoplasty as an initial procedure. In 1953, a large number of secondary thoracoplasties were performed in the belief that perhaps overdistention of the remaining lung had a deleterious effect on pulmonary function and might lead to reactivation of disease. This has not been borne out clinically.

In 1954, secondary thoracoplasty was performed only for space problem, persistent leaks, or fistula. Generally, the first rib was stripped, an apicolysis done, and parts of the second, third, and fourth ribs were removed as needed, leaving the transverse processes. Since this became standard procedure in 1954, we have had no complications from this operation, and no deformity. No evidence as yet of disease reactivation or pulmonary function

loss has become apparent in patients not receiving a secondary thoracoplasty following segmental resection.

Multiple procedures have been performed frequently; however, we are convinced that the inclusion of a thoracoplasty simultaneously with resection increases the risk of complications appreciably, and it is to be avoided except in the most suitable good-risk case. Seventy-eight per cent of our cases were uncomplicated. A comparison of the complication rate of each year is interesting. In 1953, only 70 (75 per cent) of the 94 primary operations were uncomplicated. In that year, there was one death. Anesthetic difficulties produced cerebral anoxia and eventual death. In 1954, 91 (81 per cent) out of 112 primary operations were uncomplicated, and no deaths occurred. We believe this represents a considerable improvement in technic of anesthesia, surgical judgment, and active postoperative care. The decrease in complication rate occurred at a period when our staff was reduced from four to two men, indicating that a tight, closed staff of trained personnel can probably decrease its complication rate. Another factor to be considered is that in 1954, thoracoplasty was combined with resection in only four instances. In 1953, this combination occurred 14 times, resulting in a total of 11 complications occurring in 6 of the patients. In 1954, in the four combined operations, there were only 5 complications, all of which occurred in one patient.

Persistent air leaks lasting over 2 weeks, although few in number, occurred in patients having segmental resections and in one having a lobectomy. Space problems were observed after both lobectomy and segmental resection. Bronchopleural fistula was a minor problem, most frequently occurring following a lobectomy. After lobectomy, four out of five fistulas occurred in 1953, and two out of three in 1954. All leaks, fistulas, and space problems, with one exception, were successfully treated.

Atelectasis was considered a complication when it involved a lobe or more and required use of the bronchoscope. Vigorous postoperative care has largely prevented development of this condition.

Because of rapid turnover in laboratory personnel and due to limits imposed by workload and space, we were unable to get as many positive cultures and smears from resected specimens as we would have liked. It is striking, however, how many times cultures were positive when smears and stains were negative. Cultures from 8 resected lesions in 1953, and from 9 in 1954, were positive although stains and smears had been negative. We have arbitrarily grouped the patients into those with only active lesions (pneumonic processes—4 cases), those with moderately active lesions (mixed lesions—200 cases), and those with apparently burned-out

or fibrosed lesions (inactive—1 case). Our patients had predominantly moderately active lesions.

Postoperative chemotherapy has varied with the problem at hand. We aim at giving a total of from 10 to 11 months of drug therapy pre- and post-operatively, prolonging therapy slightly in patients with far-advanced or relatively active disease, particularly when persisting after several months of preoperative therapy.

In 1953, functional results were unsatisfactory in three patients. One was discharged with a persistent bronchopleural fistula. Two patients had somewhat unsatisfactory shoulder motion due to the effects of thoracoplasty. Of the latter, one is on active duty in the Army, and one is practicing law full time. In 1954, no patient had poor functional results.

We have been able to follow 200 patients—88 of the 94 operated on in 1953 and 112 of the 1954 patients. In 195 patients, we have found no evidence of recurrence or reactivation, and we believe that they are fit for military duty or gainful employment. Of the other five patients followed, one has a bronchopleural fistula; one is hospitalized for schizophrenia (however, his tuberculosis is arrested); one is being treated for reactivation of disease in the contralateral lung; one died in a train accident; and one patient died as a result of cerebral anoxia during operation.

Our policy is to return patients to duty or temporarily retire them after completion of treatment. Thus far, we have had no evidence of relapse in those patients doing military duty or gainful civilian work.

CONCLUSIONS

It seems from the follow-up data available that pulmonary resection is effective and that to date recurrence of tuberculosis has not been a problem. Further effort must be made to reduce operative and postoperative complications, particularly that of poor functional results.

That surgical therapy can be performed with acceptable, nondisabling morbidity has been demonstrated; however, we are convinced that resection can be safe and effective only in an optimum setup with the best of equipment and trained personnel in medicine, surgery, anesthesia, nursing, and physical medicine.

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HYALURONIDASE INSTILLATION IN TREATMENT OF GANGLIA

A Preliminary Report

JAMES B. ANDERSON, *Major, USAF (MC)*
JOHN A. BOLLINGER, *Captain, USAF (MC)*

FINDING a simple method of treating a ganglion of tendon sheath or joint capsule has remained a perplexing problem of considerable interest to the military surgeon who, because of the high incidence of the lesion in people in the military age group, is more frequently confronted by it than is the civilian physician. A troublesome ganglion is found more often in those whose occupation requires optimal use of tendons and joints of the wrist. Selection of a method of therapy is complicated by the military surgeon's obligation to conserve manpower and his realization that adequate surgical excision will result in the loss of many man-hours for each patient. This preliminary report describes a simple method of treating this condition.

ORIGIN OF GANGLIA

Bunnell[1] is of the opinion that a ganglion arises from a tendon sheath or joint capsule but does not communicate with the synovial cavity. Others believe that the ganglion arises as a herniation of the synovial membrane or the joint sheath space. In support of Bunnell's conclusions on pathogenesis, some authors have found that connective tissue undergoes proliferation and mucoid degeneration with the formation of numerous small cysts that eventually coalesce into a ganglion with little or no synovial lining.[2, 3]

METHODS OF TREATMENT

Forceful disruption of the ganglion by striking the lesion with a book not only has been ineffective, but seems to be a crude and hardly professional approach to treatment.

Surgical excision has been the treatment of choice. If one accepts the theory of origin of Carp and Stout,[3] adequate surgical excision requires not only removal of the ganglion, but also stripping of the adjacent sheath or capsule to preclude recurrence. Such surgical excision usually eradicates the ganglion,

From U. S. Air Force Hospital, Washington 25, D. C.

but postoperative swelling and necessary immobilization prevent the patient from carrying out his work competently for a period of 2 to 3 weeks. Another complication of surgical treatment is keloid formation. Recurrence following surgical excision is reported as from 15 to 33 percent.[1]

Among the nonoperative methods of therapy, the injection of sclerosing agents into the ganglion has been uniformly unsuccessful.[4]

Injection of hydrocortisone acetate has been successfully employed by Becker[5] in eliminating or reducing 30 ganglia; 26 disappeared, while 4 became small and asymptomatic.

Hackel[6] recently published a preliminary report on the use of hyaluronidase injections for ganglia with considerable success. He postulates that the mucoid substance of the ganglion is of mesenchymal epithelial origin and that hyaluronic acid is responsible for its characteristic viscosity. Following admixture with hyaluronidase, a "break-down" or "degradation" occurs, resulting in a marked reduction of viscosity as measured by the Ostwald viscometer.[6,7]

On the basis of the preliminary reports just mentioned, and the stimulus of the large number of patients with ganglia seeking treatment at the Air Force Clinic of this hospital, an evaluation of hyaluronidase instillation was undertaken. Results of treatment of 81 consecutive patients with ganglia are reported.

TECHNIC

One half to one milliliter of 1 percent procaine was mixed with 500 turbidity reducing units of hyaluronidase and instilled into the cyst through a 19-gauge needle whose bevel had been shortened to facilitate injection of all the hyaluronidase into the cyst rather than part of it into adjacent tissue. Insertion of the special needle was preceded by a small intradermal wheal of procaine hydrochloride. Aspiration of pathognomonic xanthrochromic viscid mucoid material was carried out to confirm (1) the clinical impression of ganglion and (2) the location of the tip of the needle in the cyst cavity. (One tumor was eliminated from this series by this technic, because whitish material was aspirated; subsequent microscopic examination of the surgically excised tumor afforded a diagnosis of "rheumatoid nodule." Without aspiration, this case would have been a statistical failure due to faulty diagnosis.)

Thirty-nine patients were males and 42 were females. Eight patients (9.9 percent) had recurrent ganglia following previous surgical excision. Occupation of each patient and presenting site of the ganglia are listed in tables 1 and 2. Of the 81 patients, 46 were between 21 and 30 years of age, and 21 were between 31 and 40.

TABLE 1. *Occupations of the 81 patients*

Occupation	Number
Office (typing, clerical, or filing)	28
Housewife or waitress	25
Mechanic or carpenter	14
Student	4
Musician	3
Nurse	3
Manual labor or athletics	2
Telephone operator	2
Total	81

TABLE 2. *Presenting site of ganglia in 81 patients.*

Extremity	Location	Number	Total
Upper	Wrist		
	Dorsal	47	
	Volar	15	
	Hand		
	Dorsal	9	
	"Snuffbox"	2	
	Finger		
	Volar	4	77
Lower	Knee, lateral	1	
	Ankle, dorsal	1	
	Foot, dorsal	2	4
Total			81

Single injections sufficed in 68 patients. Two injections in eight, three injections in two, and four injections in three patients were carried out. Multiloculation or faulty technic may have necessitated more than one injection. Immediately after instillation of hyaluronidase, the swelling softened and the contents could be easily aspirated or expressed by pressure. Following the injection each patient was returned to normal activity with only elastic bandage compression of the site until the following morning. On re-examination in 24 hours, the swelling was usually absent. If, however, residual swelling persisted, further injections were carried out at intervals of several days.

RESULTS

Of the 81 patients, 67 (82.7 percent) responded completely. Six of the 14 in whom treatment failed had much smaller tumors which

did not feel cystic after treatment. Five patients stated that the residual swelling had become asymptomatic. A summary of the length of the follow-up period and the recurrence rate is given in table 3. In two patients, residual thickening was explored and surgically excised. A cystic ganglion was not grossly discernible in either of these specimens. Microscopic examination disclosed "thickened fibrocollagenous tissue" in one and "an obliterated cyst retaining an epithelial lining" in the other. These findings suggest that after hyaluronidase dispersion of cyst fluid, the walls collapse, become adherent, and are replaced or coapted by fibrous tissue. Such obliteration is proportional to the extent of disruption and evacuation of the ganglion. Complications were encountered, but these were inconsequential, requiring symptomatic treatment and apparently not materially detracting from the gratifying result. One patient developed a small hematoma which resorbed spontaneously, and 3 developed a nonspecific tenosynovitis, 2 of whom required plaster immobilization, responding to treatment within 2 weeks or less.

TABLE 3. *Follow-up and results of hyaluronidase instillation into ganglia in 81 patients*

Follow-up interval (months)	Number of cases	Number of recurrences
Over 12	9	2
6-12	26	5
3- 6	27	7
1.5-3	19	0
Total	81	14*

*Of the 14 refractory ganglia 13 were obviously refractory during the first three months of observation, and one within six months.

Those ganglia that ultimately recurred gave evidence in the first few months that they would be refractory, 13 of 14 recurring within 3 months. In the 8 patients whose ganglia had been surgically treated elsewhere, recurrence after surgical excision was noted within 3 months. If resolution is not obtained within 2 or 3 months, surgical excision can be carried out without further delay.

Although treatment by hyaluronidase instillation resulted in some failures, results in 81 patients appeared to be as effective (83 percent) as excision (67 to 85 percent). It did afford, however, a method for those who declined surgical treatment or for those who could ill afford loss of working time.

SUMMARY

Methods of treatment of ganglia have been reviewed. Remission of symptoms, disappearance of the swelling, or both, have been reported following the instillation of hyaluronidase in 89 per cent of 81 patients. Although early results of this preliminary study have been excellent, excision of a few refractory ganglia will be required. For those who decline excision, who cannot afford the loss of time it occasions, or who need immediate palliation of ganglion sensitivity, injection-collapse therapy would appear to be the treatment of choice.

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ANEURYSMS

Many problems remain unsolved in the removal of aneurysms. One is the provision for adequate circulation during the process of excision. Interruption of the blood supply for extended periods leads to anoxemia with disturbance of important nerve functions or localized areas of necrosis or even death. This problem may be solved by the use of a bypass to deliver oxygenated blood beyond the point of occlusion or by refrigeration of the entire body so that the metabolic need for oxygen is temporarily decreased. Such methods are unnecessary when collateral circulation is ample, as in peripheral aneurysms or those associated with coarctation of the aorta.

—JACOB K. BERMAN (sic)
in *Surgery, Gynecology and Obstetrics*
p. 116, Jan. 1954

SERVICE ARTICLES

THE SECRET OF SUCCESS

WARNER F. BOWERS, *Colonel, MC, USA*

DISRAELI once said, "The secret of success is constancy of purpose." Unfortunately, owing to the individual variations among us, these eight simple words carry different implications and connotations depending on our backgrounds and past experiences. Consequently, it is necessary for us to define what we mean by success, what comes to mind when we speak of constancy, and what we accept as our purpose. It has been said that intelligent men always agree once they know what they are talking about, and I'm sure you will admit that most of our arguments and discussions are made necessary because we have failed accurately to define our terms of reference. The art of communication is a difficult one because of semantic variations and nuances of connotation.

Let us first discuss what we mean by success, and I suspect that were we to poll this audience, or almost any group of Americans, the preponderance of definitions would hinge on bank account or other evidence of material wealth. The "have" nations as compared to the "have nots," tend to place high valuation on what can be measured, weighed, or held in the hand, and while this is not necessarily bad, there is a tendency to neglect the more intangible factors which go to make up success. Certainly all of us can point to persons who have had great material success and yet are extremely poverty stricken in their interpersonal relationships.

There is in all of us an impediment to perfect happiness: namely, weariness of the things which we possess and a desire for the things which we have not. Possibly success and happiness are not exogenous and based entirely on material possessions but they may be endogenous, arising from within as a result of such elements as maturity of reaction, equanimity, constancy of goal, and well-rounded self-development. Can we not agree that success has two general components: the exogenous, depending on the acquisition of enough material goods so that we and our families can have all of the necessities and some of the luxuries, and the endogenous, depending on sufficient personal self-development so that we can act and react in as

Presented at graduation exercises of Army Medical Service officer orientation class at Medical Field Service School, Brooke Army Medical Center, Fort Sam Houston, Tex., 12 August 1955.

From Brooke Army Hospital, Fort Sam Houston, Tex.

nearly an adult, mature manner as possible? The dictionary defines success as the degree of attaining one's desired end, and consequently we may have to leave "success" at this point until we consider "purpose."

First, however, let us examine our concept of "constancy." The word itself means steadfastness, firmness of mind, and freedom from change, that carries the unfortunate overtone of rigidity and immobility. It is all very well to stand steadfast as a rock, but you may get covered by moss. I like to think of constancy as dynamic rather than static, as changing with circumstances and situations, but always aimed in the predetermined direction. Our concept of constancy will depend somewhat on the type of goal or purpose that we select. If our goal is easily attained and too limited in scope, we find ourselves constantly in the necessity of setting up new goals as the old ones are reached. We should think, therefore, of a high purpose or ultimate goal toward which there are many lesser goals or steppingstones, but all tending toward the final end result.

Unless we have a correlated and integrated plan, we progress from crisis to crisis by erratic rushes, we explore too many blind alleys and waste too much time retrieving lost ground. Too few of us take time to consider such matters. All of us should spend a few moments each day in orienting ourselves with our goal, in thinking noble thoughts, and in taking stock of ourselves. This is not sentimentality but very hardheaded practicality.

One of the most difficult things in life is acquiring the ability to get along with our fellow men, and too often the phrase "getting along with people" carries the connotation of spineless appeasement, blind agreement, and fear of antagonizing anyone. Such vacillation is completely unacceptable and incompatible with a well-conceived goal. First, it must be realized that it is impossible to agree with everyone, please everyone, and make everyone like you. It is not even desirable.

We must carefully set our own goal, aim our actions toward it, and let the chips fall where they will so that we can live at peace with our own consciences. This is called integrity and is a highly desirable trait to be cultivated. In this vein, William Ellery Channing has said, "Whatever you may suffer, speak the truth. Be worthy of the entire confidence of your associates. Consider what is right as what must be done. It is not necessary to keep your property, or even your life, but it is necessary to hold fast to your integrity." In this day of "brainwashing" and "turncoats" it is essential that we emphasize integrity of character. How different would be the future of many young officers and soldiers had they appreciated this principle.

Too great rigidity and inflexibility is just as bad as too great tolerance. Plato said, "For every good there are two evils: the extremities in either direction.' This, of course, is a paraphrase of the Socratic doctrine of the golden mean. Even tolerance is bad in its extreme form. An example of too great tolerance is the Buddhist philosophy that all is truth or some facet of truth. By this concept, untruth is but the backside of truth and therefore simply a phase of truth. Dishonesty is simply the other side of honesty, and therefore what may seem as cheating and dishonesty to us may simply represent a variant of honesty to others.

Intolerance, on the other hand, may keep you in continual turmoil. For example, certain recent events and happenings may not be entirely to your liking and you may find yourself in a situation of which you do not entirely approve. Vain struggle against circumstances may needlessly batter you without contributing to your goal. Epictetus said, "Ask not that events should happen as you will, but let your will be that events should happen as they do, and you will have peace." This statement requires some careful thought and simply suggests that we rock with the punches and don't fight the problem. Eleanor Roosevelt has turned a neat phrase in this regard. She said, "It is not that I have so much energy, but just that I never waste any of it in indecision or regret." In other words, know where you want to go and be on your way. An interesting variation of the idea of a goal is expressed in the philosophy of Chang Kuo Lao, one of the eight Chinese immortals. He is always depicted as riding his mule facing backwards, because he felt that it makes no difference where you are going since all that really counts is how you react along the way.

Pain is the appetizer which makes pleasure more palatable. The snow-capped mountain may seem a jagged crag from the north, while it looks like a soft snowball from the south. Yet it is the same mountain; only the viewpoint has changed. The various vicissitudes of life are tools with which one's character is shaped, and mortals are placed on earth to develop character, so that whether a man has good fortune or bad is relatively unimportant. It is only his reaction to that fortune which counts. The man who suffers adversity and reacts in a proper way has developed his character in such a fashion that he has achieved a net asset, so that in the end he has been as fully benefited as though he had good fortune. Wealth and poverty are but two forces by which character is shaped, and not success and failure in themselves. Therefore, co-operate with destiny to strengthen character by whatever experience life has to offer, turning each event to good account in your favor. When we speak of turning events to your own ends and getting as much out of circumstances as you can, this may at first glance seem selfish, but such is

not the case. No man can be called selfish who advances his neighbors at the same time that he elevates himself.

This brings up the concept of loyalty. Your first and most important loyalty is to yourself and the things for which you stand. Naturally, then, you feel loyalty toward others who are honestly striving to do the best they can with the attributes they have been furnished. More generally, you owe loyalty to your government as long as it shows integrity and progress toward an acceptable goal. If these are not present, your loyalty as a citizen makes it mandatory that you play your small but important role in a corrective way at the polls. In other words, you have a proper niche to fill and it is your responsibility to fill it to the best of your ability so that you and your neighbor may profit thereby. In a more special way, those of you who are physicians owe a great duty toward and loyalty for your patients. Your patients have a right to expect that you will show complete honesty, integrity, faithfulness, truthfulness, and skill in all your dealings. Please note that I mentioned skill last, because too often we substitute mechanical and technical skill for medical wisdom. Many of us have knowledge, but what we need most is the wisdom to use that knowledge. Knowledge is static, whereas wisdom activates knowledge to make it dynamic and useful.

From what has been said, I hope you will have arrived at the conclusion that a suitable goal is the highest possible development of all the faculties and capabilities with which you have been endowed, and I hope you will agree that this is not a selfish goal, because it implies that you will assist others in their quest for development. More simply stated, this means that we should strive by all means at our command to become mentally mature, emotionally stable, well-integrated adults. Kung Fu Tse, whom we know as Confucius, has stated that a gentleman has nine aims: to see clearly, to understand what he hears, to be warm in manner, dignified in bearing, faithful in speech, painstaking at work, to ask when in doubt, in anger to think of difficulties, in sight of gain to remember right. A more modern and scientifically stated definition of maturity is that of Doctor Edward Strecker, who said that the really mature person possesses: ability to stick to a job; reliability, giving more than is demanded; persistence against obstacles; power of decision; determination to succeed and will to live; co-operativeness with others; and adaptability to time, place, and other people.

You are about to enter on a period in your life which may not have been entirely of your own choice and toward which you may not have completely unmixed feelings. We urge you to approach this with as mature and adult an attitude as you can, attempting to turn the situation to your advantage from the stand-

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point of personal development. The attitudes and mannerisms which you are developing now will mold your future success, and we urge you not to sell yourself short. All of your patients should be treated just as if they were your most important private patients, and any duty you are asked to undertake should be completed according to your very best ability. Abraham Lincoln said, "I like to see a man proud of the place in which he works; I like to see a man work so that the place is proud of him."

We wish you well in your coming assignments and hope that you will be as proud of us as we are to have you with us.

Some hospitals provide the doctor with a comfortable chair, while the patient is given a cheap, inferior, uncomfortable stool. This has a significance beyond the provision of comfort for the physician. It implies his superiority and the patient's inferiority. Sometimes this may be therapeutically advantageous, because it gives the doctor prestige, but sometimes it is a disadvantage. Prestige and rapport aid suggestion, and make it easier for the patient to accept the doctor's advice; but rapport is not dependent on prestige. Indeed the doctor's prestige may hinder the formation of rapport, if the patient associates prestige with the idea of inaccessibility.

—AINSLIE MEARES, M. B., B. AgtSc. Melb., D. P. M.
in *Lancet*, p. 593, Sept. 18, 1954

The great strength of the physician rests not in his degree, his training, his license to practice, nor his experience—his strength is the man that he is. What is the most important question to be asked concerning a professional colleague—is it his school, his hospital background, his associates, or even his honors? It is none of these, the great question is "What kind of a man is he"? The other things are important, yes, some even necessary, but the test of the man is the man.

—THOMAS H. ALPHIN, M. D.
in *Missouri Medicine*
p. 1011, Dec. 1954

REPORTING INFLUENZA AND ACUTE RESPIRATORY INFECTIONS

ARTHUR STULL, *Ph. D.*

ALTHOUGH influenza vaccine is being routinely administered to military personnel this winter, prompt epidemiologic and clinical reporting of any sharp outbreak of acute respiratory disease and the collection of diagnostic specimens for virus isolation and serodiagnosis are still of importance in the continuing study of respiratory infections. Such studies depend on the interest and co-operation of clinical, preventive medicine, and laboratory personnel. Instructions describing the proper method of reporting of outbreaks and the collection and shipping of specimens have been issued through technical channels.

INFLUENZA

The instructions suggested that throat washings should be obtained from six to eight patients in the early acute phase of the illness for virus isolations in any outbreak of suspected influenza.[1,2] Blood specimens should also be secured from about 12 patients in the acute and convalescent phase of the disease, including those patients from whom throat washings were collected. Blood from patients in the acute phase should be taken as early after the onset of illness as possible and again from 8 to 10 days later. Specimens for these studies should not be taken from persons who have received influenza vaccinations during the preceding three-week period.

OTHER RESPIRATORY INFECTIONS

The importance of determining the prevalence of RI-type virus infections[3,4] was also stressed in the cited instructions. In any outbreak, the paired sera should be first tested for influenza, and if negative, the sera from about six patients should be retested for increase in RI antibodies. Because RI antibodies may not achieve maximum levels until about 14 days after the onset of illness, it is well to include in addition to the 8- to 10-day blood sample, one taken from 14 to 21 days after the onset of the illness.

From Office of the Chief Pathology and Allied Sciences Consultant, Office of The Surgeon General, Department of the Army, Washington, D. C.

RESPIRATORY INFECTIONS OF UNKNOWN ETIOLOGY

The Department of Virus and Rickettsial Diseases, Walter Reed Army Institute of Research, Washington, D. C., is actively engaged in continuing studies to isolate viruses from patients with respiratory diseases whose etiology is unknown. Any outbreak of respiratory disease in which the cause seems to be neither influenza nor RI-group infection should be reported promptly to the respective Surgeon General so that study can be made. Of special interest are patients with primary atypical pneumonia in whom cold agglutinin or streptococcus MG agglutinin tests become positive.

All six Army area medical laboratories; the 406th Medical General Laboratory, Tokyo, Japan; the USAREUR Medical Laboratory, Landstuhl Medical Center, Germany; the Tropical Medical Research Laboratory, Puerto Rico; the Army Medical Research Laboratory, Kuala Lumpur, Malaya; and the Hawaiian Medical Laboratory are prepared to carry out tests for influenza and RI-type virus and assist in these studies.

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THE EDUCATED PHYSICIAN

A doctor must be well educated, and that does not mean merely stuffed with knowledge, but capable of understanding in the sense that Lord Morley meant when he said the mark of an educated man was the ability to know when a proposition is proved or, what is often more important, when it is *not* proved.

—W. MELVILLE ARNOTT
in *Proceedings of the First World Conference on Medical Education*
Oxford University Press, 1954. p. 278

A MODIFIED SCREENING QUESTIONNAIRE FOR SERVICEWOMEN

JOSEPH FRIEDMAN, *Lieutenant (junior grade) (MSC) USNR*

PSYCHIATRIC screening of women for service is a relatively new area in military psychiatry and possesses some unique features. For the most part, the psychologic questionnaire and tools used as adjuncts have been borrowed from the screening of men. This article describes the need for modification of these methods and one step that has been taken to achieve this end.

The psychiatric unit at this recruit depot has as one of its functions the assessment of women recruits. This evaluation consists of interviewing all women recruits at least once and at periodic recall until a decision is made regarding their emotional suitability for service.[1] As aids in the initial screening several materials are used, including a questionnaire designed to elicit signs of maladjustment. It is with this tool the present article is concerned.

Although the scale had originally been designed for men, the past procedure had been to use the identical list of items for both male and female recruits. For some time the feeling had been growing that in the case of women much of this material was nondifferentiating; that is, that many of the items were of limited value in sorting women into two categories, psychiatrically "clear" and psychiatrically "suspect." I therefore undertook a twofold study: (a) to measure the effectiveness of the existing scale, and (b) to make improvements if it was found lacking.

METHOD AND RESULTS WITH ORIGINAL QUESTIONNAIRE

The original questionnaires of all women who passed through the recruit depot during 1954 were examined. The responses of those who eventually became psychiatric casualties (N = 92) were recorded. Of those who adjusted to service (N = 916) every fifth record was selected (N = 183) and their responses were also recorded. A statistical technic was then applied to investigate whether or not the two groups tended to answer the items in a significantly different manner. The statistic considered most appropriate was the t-ratio of proportions.[2]

From U. S. Marine Corps Recruit Depot, Parris Island, S. C.

Of the 70 items, 26 were found to be significant at the .05 level of probability and 13 at the .10 level. The remaining 31 items did not approach statistical significance. While these results provided a nucleus for a scale, it was believed that, as a whole, the tool was inadequate for its purpose and that modifications would be desirable.

METHOD AND RESULTS WITH MODIFIED QUESTIONNAIRE

New questions were then derived from the interviewing technics of the examiners. Another valuable source of material was the autobiographic sketch that women marines prepare before further interviewing as they progress through a trial at duty. Still another source were the anonymous questions these recruits submitted in response to a lecture on psychosexual factors and their implications for group living.

A pretrial of these 60 items was administered to 62 recruits, and those items that were checked once or not at all were eliminated. The remaining 55 items were then submitted to a group of 201 recruits who adjusted successfully, of which every other case was used (N=100), and to 39 psychiatric failures. Statistical analysis of the results of testing in this group of 139 subjects showed that 20 of the 55 items were significant—16 at the 0.05 level of confidence and 4 at the 0.10 level.

The 39 significant items from the original questionnaire and the 20 from the new one were then combined. Of these 59, 2 were dropped due to excessive overlay with the others. The modified scale when completed consisted of 42 items significant between the .001 and .05 levels and 15 at the .10 level (See Appendix).

Some attempt has been made to place the items into various categories, and a key has been added to aid the interviewer in noting along what lines the recruit's problems lie. These categories are: (a) stress situations, (b) interpersonal relations, (c) reactions to enlistment, (d) relations to authority, (e) somatic concern, (f) withdrawal and/or projection mechanisms, (g) mood, (h) psychopathy, (i) tension and anxiety, (j) acceptance of feminine role, and (k) miscellaneous. The questions are framed so as to require both affirmative and negative answers, thus reducing the tendency to superficially mark the list.

Should this technic prove to be clinically satisfactory, it is conceivable that an extension of its scope would be warranted. It might be possible to establish a cut-off score on the number of problems claimed and to cross-validate this on another group of women. The check list would then be considered a test, and the scores might be used to predict service maladjustment. To assess their predictive powers, these results could then be compared with the results of interviews and trials at duty.

SUMMARY

A statistical evaluation of the 70-item questionnaire was done to measure the discriminatory power of its items as applied to women. While many were significant statistically, the tool as a whole was believed to be inadequate for its purposes. Additional items were written and significance tests again run until a total of 42 items were accumulated which discriminated at least at the .05 level. An additional 15 items significant at the .10 level were also used, and a modified version of the questionnaire was evolved for servicewomen.

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APPENDIX

Below are a series of questions and statements on several different topics. You are to answer "yes" or "no." "Yes" answers are represented by checking the box; "no" answers by leaving it blank. Be sure to answer as you really feel, not as you think others would answer. Your honesty is very important.

1.____ Does rushing and being under pressure upset you?
2.____ Are you often worried or upset?
3.____ Do you feel that you will have trouble making good in service?
4.____ Have you ever been fired or asked to resign from a job?
5.____ Do you often feel tired, run down, and gloomy?
6.____ Do you feel comfortable around new people?
7.____ Insofar as you know, were you considered a very healthy child?
8.____ Does being hollered at make you really upset?
9.____ Does it seem to you that men get a better "deal" in life?
10.____ Would you consider yourself a nervous person?
11.____ Could you do more for your country in a civilian job than in the service?
12.____ Do you sometimes get violently angry without good reason?
13.____ Are you ever bothered with nervousness?
14.____ Did your family move around enough to handicap you in making good friends?
15.____ Do you have difficulty learning under stress?
16.____ Did you dislike going to school as a kid?
17.____ Do you often have trouble in getting to sleep?
18.____ Life is best when we are children.
19.____ Do you ever have pains in the heart or chest?
20.____ As a kid did you feel you were often punished unfairly?
21.____ Do you ever feel that you have more than your share of bad luck?

22.____ Are you often ill at ease around your friends?
23.____ Have you ever been in trouble for drinking?
24.____ Did you ever look in a mirror and think you might be someone else?
25.____ Do you feel that it was unfair for you to be called into service at this time?
26.____ Were either of your parents often mean or unkind to you?
27.____ Did you bite your fingernails often as a kid?
28.____ All people are guilty of heavy sins.
29.____ Usually do you prefer to be alone rather than with other people?
30.____ Have you ever smoked reefers or taken dope?
31.____ Do you have any particular physical or health problem?
32.____ Does it make you uncomfortable when you haven't privacy in which to bathe and dress?
33.____ Do you really like to fight?
34.____ Have you had to make undue sacrifices by coming into the service?
35.____ Do boys and men seem too fresh to you?
36.____ Do people usually misunderstand you?
37.____ Does most of life seem dull to you?
38.____ Have you ever had dizzy spells or fainting spells?
39.____ Do you resent others trying to advise you?
40.____ Are you frequently bothered by back pains?
41.____ Do you often feel that most of your troubles are not your fault?
42.____ Do you have dates less often than most girls your own age?
43.____ When you were punished, was it usually more severe than other kids got?
44.____ In spite of what they say, people only look out for themselves.
45.____ Do you feel that your life has been unsuccessful up to now?
46.____ Do you consider your friends to be your equal?
47.____ Are you ever troubled by a sick headache?
48.____ Do you have trouble making friends?
49.____ Will your time in the service keep you from achieving your personal goals?
50.____ The worst thing about school was the bossy attitude of the teachers.
51.____ Has anyone in your family ever had a nervous breakdown or been treated for their nerves?
52.____ Do you think you were loved more by one parent than the other?
53.____ Do people ever seem to purposely annoy you or pick on you?
54.____ Do your hands ever tremble enough to bother you?
55.____ Do you often get down in the dumps?
56.____ Do you frequently drink just to get drunk?
57.____ Have you ever held yourself back in some group to avoid being noticed?

THE MANAGEMENT OF LARGE BOWEL INJURIES IN THE KOREAN CAMPAIGN

H. HASKELL ZIPERMAN, *Lieutenant Colonel, MC, USA*

PERHAPS no greater advances in traumatic surgery have been made than those made during World War II for the treatment of penetrating abdominal trauma. In World War I the policy of watchful waiting in the management of intra-abdominal injuries was repudiated. World War II saw the adoption of principles and practices in the treatment of abdominal wounds that led to gratifying reductions in mortality and morbidity. It remained for us in the Korean campaign to refine, polish, and add to these principles the surgical knowledge and technics gained in the intervening war-free years. That the practices on which we built were solid was evidenced by our initial low morbidity and mortality. That the refinements we added were indeed worthy of adoption was indicated by an over-all reduction in mortality from 4.5 per cent in World War II to 2.4 per cent. This reduction was merely a reflection of the decrease in mortality among patients wounded in various specific regions, of which the abdomen was one of the most important.

One of the outstanding contributions to the surgical treatment of patients with abdominal wounds during World War II was that of Ogilvie,[1] who first advocated the technic of exteriorization of the wound in the colon. Second perhaps to this advance was excision of the coccyx with incision and drainage of the presacral space for wounds of the rectum. These two technics alone led to the saving of thousands of lives both in World War II and in Korea.

INCIDENCE

The importance of treatment of large intestine wounds cannot be over-emphasized. Every publication on abdominal trauma caused by war injuries lists the colon, either alone or in combination with other abdominal viscera, as one of the three most frequently injured intra-abdominal organs. It is estimated that wounds of the large and small intestine together comprise about 70 per cent of all intraperitoneal damage among casualties with abdominal injuries. This is to be expected because these organs occupy a major portion of the abdomen. Specifically, in World War II, Ogilvie reported 128 wounds of the colon in 381 abdominal

From Brooke Army Medical Center, Fort Sam Houston, Tex.

casualties—an incidence of 33.6 per cent. The Second Auxiliary Surgical Group[2] in World War II reported 1,106 colon wounds in 3,154 abdominal casualties—an incidence of 35.1 per cent. In the Korean conflict, the Surgical Research Unit[3] reported the colon injured 140 times in 402 abdominal casualties—an incidence of 34.8 per cent.

FACTORS INFLUENCING MORTALITY

By themselves, statistics on incidence do not portray the true seriousness of wounds of the colon. Not only do such wounds produce a significant mortality, but, because they occur very frequently in combination with wounds of other organs, they also contribute significantly to the death rate from wounds of these other organs. It has, in fact, been shown repeatedly that with intra-abdominal wounds mortality will vary directly with the number of organs involved.

Shock. The greatest single mortality-producing factor in the combat zone is shock. Perhaps the three major causes of shock among battle casualties in Korea were: (1) severe exsanguination due to major arterial injury; (2) extensive damage to large muscle masses such as those of thighs and buttocks; and (3) massive fecal contamination of the peritoneal cavity. That the latter was of importance also in World War II was illustrated by Bradford and Campbell,[4] who in their report on fatalities incident to war wounds of the abdomen found that 19 of 91 deaths were secondary to shock from severe fecal contamination of the peritoneal cavity. That the presence of shock is an important, if not the most important, factor in mortality among battle casualties is shown by Wylie and co-authors,[5] who reported a case fatality rate of only 5.5 per cent in 903 patients with thoracoabdominal wounds not in shock on admission compared to a case fatality rate of 59.6 per cent among those who were in severe shock on admission.

Several other factors, either alone or in combination, influence mortality during war. Among these are the type of warfare, the modes of evacuation, the availability and use of antibiotics, and the experience of combat surgeons.

Type of warfare. In a static war, such as prevailed for so long in Korea, high-priority surgical installations did not move frequently. As a result, they were always well organized for the reception of casualties, and a minimum amount of time was wasted from admission to operation. Furthermore, their evacuation lines and procedures were so well standardized and understood that little time was lost in sending casualties to them.

Modes of evacuation. The more rapid and atraumatic the means of evacuation, the better is the condition of the seriously wound-

ed on arrival at a surgical installation. In Korea, because of U. N. air control and the type of terrain, helicopter evacuation was frequently used. This resulted in a marked decrease in the time lag[6] between wounding and operation as compared with World War II.

Availability and use of antibiotics. The statistics of the Second Auxiliary Surgical Group on thoracoabdominal wounds in the second World War show that coincident with the use of penicillin there was a drop in mortality of from 10 to 15 per cent. This by no means implies that antibiotics are a substitute for the application of sound surgical principles and practices in the initial treatment of casualties. Rather, antibiotics are a means of supplementing good surgical practice and extending its principles. Adequate supplies of all antibiotics were readily available in Korea and were extensively used. It became routine, in fact, for every casualty to receive penicillin at battalion aid stations, and this was supplemented, where indicated, by the broad-spectrum antibiotics.

Experience of combat surgeons. Every surgeon, both in World War II and in Korea, had to learn the principles of combat surgery by actual experience. With increasing experience, the mortality rate among the wounded on whom he operated decreased. The surgeon newly arrived in a combat zone leaves a trail of poorly débrided and infected wounds until, with continual practice, he learns to apply all of the correct principles and technics for an adequate débridement.

DIAGNOSIS

Among battle casualties with abdominal wounds, diagnostic procedures are begun with an inspection of the patient to determine the location of wounds of entry and exit. On the basis of their location and the man's position at the moment of wounding, the trajectory of the missile through the body may be determined, and the probable organ damage estimated. Where only a wound of entry exists, anteroposterior and lateral roentgenograms serve to localize the retained metallic missile and thus give valuable information with regard to its trajectory and probable organ damage. In the absence of severe associated wounds, the presence of shock and its severity conveys valuable information with regard to the multiplicity of the intra-abdominal trauma for, generally speaking, there is a direct relation between the number of viscera damaged and the degree of shock. Abdominal splinting is a valuable diagnostic aid, but unfortunately it is not an invariable accompaniment of perforated viscera. Bowel sounds are usually absent, especially in casualties with perforated hollow viscera. One must never forget the digital rectal examination and, where indicated, sigmoidoscopic examination. This pro-

cedure becomes especially important in the diagnosis of wounds of the rectosigmoid and rectal colon, for these wounds most frequently are responsible for the finding of blood in the rectum. Where all other methods of producing a diagnosis of intra-abdominal injury have failed, débridement of the wound tract with or without recovery of the missile may indicate whether penetration of the peritoneum has occurred. In this procedure, the casualty is prepared as if for definitive surgery. The wound tract is débrided and, if penetration of the peritoneum is found, a definitive laparotomy is performed. In all suspected abdominal casualties where the diagnosis cannot be confirmed, exploratory laparotomy is indicated, for in young healthy adults in the heat of combat, symptoms and signs may appear late. By using the diagnostic procedures outlined above, the findings in no more than 2 or 3 per cent of laparotomies in Korea were negative. Pearson and co-authors,[7] however, reported that 8 per cent of explorations in 303 patients with suspected intraperitoneal wounds operated upon during World War II were negative.

TREATMENT

By the end of World War II, exteriorization of the colon for wounds was an accepted and obviously lifesaving procedure. This consisted of mobilization of the injured segment so that it could be brought through the abdominal wall without tension and held there as a loop colostomy by placing either a glass rod or suture tube beneath it and through the mesentery. A functioning colostomy was then established by either incising or unroofing the antimesenteric surface of the loop. Where the injury to the large bowel was extensive or on the mesenteric border, treatment consisted of division or resection of the wounded bowel with exteriorization of both ends as a spur for later crushing. Wounds of the intraperitoneal rectum and that part of the rectosigmoid colon that could not be mobilized for exteriorization were treated by closure of the perforation and the construction of a proximal, diverting spur type of colostomy.

In the Korean conflict the principle of colon exteriorization was adopted as standard procedure for wounds of that organ. An attempt was made to perform "closed loop" colostomies by exteriorizing the perforation and then suturing it so that the bowel could be dropped back intact and without anastomosis after four or five days. When a review of results indicated that about 90 per cent of these broke down or required subsequent opening because of obstruction at the abdominal wall, closure of the wounded loop was abandoned. At least one surgeon during World War II, Snyder,[8] attempted "closed loop" colostomies. He believed they were successful in 90 per cent of selected patients.

While most surgeons in World War II favored the use of a spur type of colostomy for complete fecal diversion, Poer[9] by the end of that war felt that spur construction should be abandoned because of the danger of crushing a poorly constructed spur and because he believed that the resistance developed by the local peritoneum was of such a degree as to render extraperitoneal colostomy closure unnecessary. In the Korean conflict only an occasional spur type of colostomy was constructed. Not only did we believe that local peritoneal immunity and antibiotic bowel preparation permitted intraperitoneal colostomy closure, but we considered that spur colostomies did not adequately divert the fecal stream. Instead, where a diverting colostomy was needed, we advocated, in Korea, that the bowel ends be separated by at least two inches of skin and peritoneum, either through two ends of one incision or through two separate stab wounds.

In both the Korean conflict and in World War II, the use of colostomies apparently solved the problem of how to treat wounds of the transverse and descending colon most expeditiously and with the greatest saving of life. Because of the liquid nature of the feces in the cecum and ascending colon, exteriorization of this portion of the bowel was attended by great morbidity and mortality due to skin excoriation and fluid and electrolyte imbalance. How best to treat wounds of the right colon remained controversial to the end of the second World War, and the same controversy flared anew in Korea.

Many different ideas prevailed among both British and American surgeons in World War II as to how best to handle wounds of the cecum and ascending colon. Thus, we find Welch[10] quoting the Second Auxiliary Surgical Group as having an early case fatality rate of 64.7 per cent when right colon wounds were treated by right hemicolectomy and double-barreled ileocolostomy. This rate later in the war was reduced to 51.7 per cent by performing a resection of the right colon plus anastomosis of ileum to transverse colon. On the other hand, Colcock[11] favored the double-barreled ileocolostomy spur because he believed anastomosis was time-consuming and, therefore, added to the patient's shock. Murray[12] thought that right hemicolectomy was a lethal procedure for "battle abdomens" and favored resection of the damaged segment only, with exteriorization of the ends associated with anastomosis of ileum to transverse colon.

Because of the diversity of acceptable procedures, it was deemed unwise to recommend one procedure as standard for all wounds of the right colon in the Korean conflict. The greatest success achieved by most surgeons was obtained by right hemicolectomy and anastomosis. Unfortunately, no statistics are

available to back this up. Small perforations of the cecum were treated either by closure or by exteriorization by means of a cecostomy. I had one patient with a perforation through the base of the appendix and cecum that was treated by appendectomy and appendicostomy.

In Korea, multiple wounds of the colon occasionally presented perplexing problems in management. When two simple perforations were present at a considerable distance from each other, it was recommended that the distal one be sutured and left in situ and the proximal one be brought out as a diverting colostomy. When the perforations were close together, it was recommended that both be exteriorized as a single loop colostomy with the perforations connected by incision of the intervening bowel. When the colon injury was extensive at multiple locations, it was recommended that resection and exteriorization be performed at the proximal site and resection plus anastomosis at the distal site. When the patient's condition was such as to preclude taking the time for anastomosis, it was believed that multiple resections with exteriorization at each site constituted the quickest and simplest procedure for extensive colon wounds in multiple locations.

MORTALITY

When one considers the mortality for wounds of the colon in World War II, it must be recalled that the principle of exteriorization was being standardized and, as with any new procedure, the initial mortality was high. This was reflected in the mortality for the entire war, even though in the latter period of the war the mortality was decreased. A gratifying reduction in the mortality of colon wounds was effected in the Korean conflict as compared with World War II. Thus, in 1,106 wounds of the colon treated at the Second Auxiliary Surgical Group, the case fatality rate was 37 per cent. In Korea, 140 colon wounds reported by the Surgical Research Unit resulted in a 15 per cent case fatality rate. A personal communication from the medical statistics division of the Surgeon General's Office on the basis of as yet incomplete statistics indicates a case fatality rate of 15.9 per cent among 372 wounds of the colon and rectum in Korea. This parallels the roughly 50 per cent reduction in mortality of all wounded in the Korean conflict as compared with the earlier war.

SUMMARY

The management of war wounds of the large bowel in Korea was based on the concept that whenever possible these wounds should be treated by exteriorization. Because this mode of therapy was based on practices initiated during World War II, these practices are reviewed and the changes instituted during

the Korean conflict are presented. As a result of these modifications and of certain influencing factors, there was a reduction in mortality of 50 per cent in large bowel injuries in Korea as compared with World War II.

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NEW NAME FOR ARMY GRADUATE SCHOOL

On 1 November 1955 the school component of Walter Reed Army Medical Center was redesignated "Walter Reed Army Institute of Research." Since 1950 this component has been known as "Army Medical Service Graduate School."

No change will be made in the mission of this institution, according to Major General Leonard D. Heaton, MC, USA, Commanding General of the Center. It will continue to provide medical research and professional graduate training required by the U. S. Army to fulfill its role in the national defense.

Brigadier General John R. Wood, MC, USA, Commandant of the school since May 1954, will carry on his duties under two new titles. He will be Director of the Institute and Commandant of the Institute's education and training activities.

ARMY EXPERIENCE CAN LEAD TO SECOND CAREER

In the past several months, many Regular Army Medical Corps officers who had completed over 20 years of service have retired voluntarily to accept top positions in the fields of medical teaching, administration, and research. Young medical officers should be aware that one of the most attractive features of the U. S. Army Medical Corps is this opportunity to enjoy two careers in one lifetime.

The following are only a few of the more recent retirees who have made significant contributions to military medicine and who have begun their second careers in responsible civilian positions.

* * *

DR. GEORGE E. ARMSTRONG, *Vice Chancellor for Medical Affairs at the New York University and Bellevue Medical Center, New York, N. Y.*

After serving as a private in the Student Army Training Corps in World War I, Doctor Armstrong received his M. D. degree from the Indiana University School of Medicine in 1925. In the meantime, he

enlisted in the Indiana National Guard and rose to the rank of Technical Sergeant. Commissioned a First Lieutenant in the Army Medical Corps, Doctor Armstrong served at various Army posts overseas and in the United States prior to World War II. During World War II, he served as Assistant Theater Surgeon and later as Surgeon of the China Theater. His Army career was culminated by his appointment as Deputy Surgeon General of the Army in 1947 and as The Surgeon General in 1951.

* * *

DR. WAYNE G. BRANDSTADT, *Assistant Editor, Journal of the American Medical Association, Chicago, Ill.*

Doctor Brandstadt entered the Army Medical Corps in 1930. He had received his M. D. degree from the University of Chicago in 1923. He subsequently was graduated from the Army Medical School, the Medical Field Service School, and the Command and General Staff School. In 1946, Doctor Brandstadt received his Master's degree in Public Health from the Johns Hopkins University and was subsequently certified by the American Board of Preventive Medicine and Public Health. His major assignment in World War II was as Commanding Officer of the 53d General Hospital in the European Theater of Operations. Following

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World War II, Doctor Brandstadt was appointed editor of the *Bulletin of the U. S. Army Medical Department,* a post which he held until the medical publications of the Army, Navy, and Air Force were unified in January 1950. At that time, he joined the staff of the new publication, the *U. S. Armed Forces Medical Journal,* and subsequently became its editor-in-chief until his retirement in August 1953.

* * *

DR. RAWLEY E. CHAMBERS, *Mental Director for the Texas State Hospitals and Special Schools, Austin, Tex.*

Doctor Chambers began his 29-year Army career in World War I as an enlisted man with the Field Artillery and eventually rose to become the Army's chief psychiatrist. He was commissioned a First Lieutenant in the Army Medical Corps after receiving his M. D. degree from the Ohio State University in 1926. During World War II he commanded the 12th Evacuation Hospital, the 77th Station Hospital, the 7th General Hospital, the VII U. S. Provisional Hospital Group, and the 805th Hospital Center, all in the European Theater of Operations. He was appointed Brigadier General and Chief of the Professional Division in the Office of The Surgeon General in 1952. At the same time, he served as Chief Consultant in Psychiatry and Neurology.

* * *

DR. CHARLES L. LEEDHAM, *Director of Education, Frank E. Bunts Educational Institute of the Cleveland Clinic Foundation.*

A diplomate of the American Board of Internal Medicine, Doctor Leedham, a 1928 graduate of State University of Iowa College of Medicine, received wide experience at Army posts both in the United States and overseas areas. In World War II, he commanded the 48th Evacuation Hospital in the Ledo Road sector of the China-Burma-India Theater and later became Base Surgeon of the Base Section with headquarters

in Calcutta, India. While in his last assignment as Chief of the Education and Training Division in the Office of The Surgeon General, Doctor Leedham also served as Secretary of the American Medical Association Military Medical Section, and as The Surgeon General's representative on medical education to the Department of Defense, the National Intern Matching Plan, the MEND Committee of the Association of American Medical Colleges, as well as to accrediting authorities in medical educational fields.

* * *

DR. JOHN HARRY KING, *Head of the Section of Ophthalmology of the Washington Clinic and Associate Clinical Professor of Ophthalmology, Georgetown University School of Medicine.*

Doctor King received his M. D. degree from Georgetown University School of Medicine in 1934, entered the Army Medical Corps in 1935 and specialized in ophthalmology, training at Walter Reed Army Medical Center and the New York Eye and Ear Infirmary. A diplomate of the American Board of Ophthalmology, Doctor King served in the Philippine Islands, Hawaii, and Italy, as well as four tours of duty at the Walter Reed Army Medical Center. His last tour of duty there was as Chief of the Ophthalmology Service, Director of Ocular Research, and Consultant in Ophthalmology to The Surgeon General of the Army. He has written about 35 scientific articles on the eye, is coauthor of a manual of eye surgery, and is the inventor of several eye instruments.

* * *

DR. TOM F. WHAYNE, *Professor of Preventive Medicine, Department of Preventive Medicine and Public Health, University of Pennsylvania School of Medicine.*

After his graduation from the Washington University School of Medicine (St. Louis) in 1931, Doctor Whayne entered the Army Medical Corps in 1934. During his Army career, Doctor Whayne held several key assignments in the field of preventive medicine and twice was Chief of the Preventive Medicine Division in the Office of The Surgeon General. He studied at the Harvard School of Public Health from 1948 to 1950, where he earned degrees of Master of Public Health and Doctor of Public Health. He was certified a diplomate of the American Board of Preventive Medicine in 1949. He served as Military Advisor to the American Delegation to the First World Health Assembly in 1948 and to the Sixth World Health Assembly in May 1953.

* * *

CASE REPORTS

Acute Hemolytic Anemia Complicating Infectious Mononucleosis

CHRISTOPHER C. FORDHAM, III, *First Lieutenant, USAF (MC)*

INFECTIOUS mononucleosis is a common cause for hospitalization in the armed services. The usual course of the disease is one of gradual but uneventful recovery. Among the complications which may make the individual patient a serious medical problem is the development of acute hemolytic anemia. This apparently is a rare event, there having been about 15 cases reported in the American literature at this writing.[1-10]

CASE REPORT

A 19-year-old airman was admitted to this hospital on 19 May 1955. Though somewhat vague about his symptoms, he apparently had been entirely well until 12 days before admission when he noted the onset of malaise, fatigability, and anorexia. Several days later, he developed postprandial nausea and vomiting and sensations of chilliness and feverishness. These symptoms abated somewhat after 2 or 3 days and the patient continued to carry out his regular duties as an electrician. Because of persistent listlessness and fatigability, however, he presented himself for medical attention. He had noted no definite changes in the color of his urine or stools. There was no history of recent drug ingestion or injection, with the exception of penicillin administered 4 to 5 weeks previously for treatment of a superficial skin infection. The past and family histories were noncontributory.

Physical examination on admission disclosed a thin, pale, white youth, chagrined at the prospect of remaining in the hospital. The oral temperature was 98.2° F.; the pulse, 75; and the blood pressure, 125/80 mm. Hg. The sclerae were nonicteric, the pharynx clear. The heart and lungs appeared to be normal. The abdomen was soft; the liver edge could be felt 2 cm. beneath the right costal margin and was slightly tender; there was minimal punch tenderness over the right costal margin. The spleen could not be palpated. Slightly enlarged, nontender lymph nodes could be felt in the anterior cervical, axillary, and inguinal areas.

Examination of the initial blood specimen revealed a total white blood cell count of 16,600 per cu. mm. with a differential count of 6 percent neutrophils and 94 percent lymphocytes, 40 percent of which were atypical, showing cytoplasmic vacuolation, indented nuclei, and serrated nuclear margins. Hemoglobin was 13.6 grams per 100 ml.; and

From U. S. Air Force Hospital, Westover Air Force Base, Mass.

hematocrit, 42 ml. per 100 ml. Urine showed two-plus albumin and a few cellular elements. A serologic test for syphilis was positive with a cardiolipin quantitative titer of 1:8. Initial heterophil agglutination was 1:112: there was no absorption by guinea pig kidney. Sulfobromophthalein retention was 13.5 percent in 45 minutes.

During the first 2 days of his hospital stay, the patient had a moderately febrile course characterized by listlessness and anorexia, but he had no specific complaints. On the second hospital day, a peculiar phenomenon was noted. Blood obtained by routine venipuncture and allowed to clot invariably expressed serum which was discolored by hemolysis, whereas oxalated blood for hematologic study demonstrated clear plasma after centrifugation. Coombs' test at this time was negative. On the third and fourth hospital days, the patient's oral afternoon temperature exceeded 104° F. and although he remained mentally alert he was phlegmatic, denying specific complaints. On the fourth hospital day his skin and sclerae appeared slightly icteric and the serum bilirubin was 2.13 mg. per 100 ml. At that time the liver edge remained palpable and tender but the spleen could not be felt. On the morning of the fifth hospital day a repeat hemoglobin value was reported as 11.1 grams per 100 ml.; the hematocrit, 34 ml. per 100 ml.; and, for the first time, an area of hemolysis could be seen overlying the buffy coat in the oxalated blood specimen. Several hours later, a drop in the hemoglobin to 9.5 grams and the hematocrit to 30 ml. per 100 ml. was reported. The patient was placed on continuous intravenous drip, and intramuscularly administered ACTH, 40 mg. every 6 hours, was started. The next day he was clinically improved, subjectively and objectively. In vitro hemolysis remained evident in both the clotted and unclotted blood samples. The urine contained hemoglobin, but the output remained good and no crystals were observed in the sediment.

On the seventh hospital day, 2 days after the apparent onset of hemolysis, the hemoglobin reached its low point of 8.6 grams and the hematocrit, 28 ml. per 100 ml. The white blood cell count at that time was 8,000 per cu. mm. with 75 percent lymphocytes, half of which were atypical. Steroid therapy and fluids given intravenously were continued. On 27 May, the ninth hospital day and the fourth day after the onset of hemolysis, the patient had a stable hemoglobin and hematocrit, and a Coombs' test was positive. His urine output remained good and his spleen became palpable 1 to 2 cm. beneath the left costal margin. Osmotic fragility studies were normal and the reticulocyte count was 6 percent. The heterophil titer reached a maximum level of 1:448 with one tube absorption by guinea pig kidney and thereafter diminished. He was switched to cortisone orally given on the fourth day following onset of hemolysis, and the dose of this steroid was gradually reduced thereafter from its initial level of 200 mg. per day. His subsequent hospital course was one of uneventful recovery with the reversal of all abnormal physical and laboratory findings, including the cardiolipin microflocculation

test. He was discharged from the hospital 21 June, and when seen in the clinic 3 and 6 weeks later had remained completely well.

Comment. It was clear soon after hospital entry that this patient presented clinical and laboratory features characteristic of infectious mononucleosis. Several days thereafter, an acute hemolytic process supervened, resulting in a striking reduction in the hemoglobin and hematocrit values within a matter of hours. Hemoglobinuria, reticulocytosis, and a positive antiglobulin test were demonstrated. Subsidence of the hemolytic process and uneventful clinical recovery were chronologically related to the institution of adrenal steroid therapy.

Infectious mononucleosis is one of a heterogeneous group of diseases occasionally associated with an acute hemolytic process. The term "symptomatic hemolytic anemia"[11] has been used to describe this relationship, implying that the hemolytic process is etiologically related to the underlying disease. Possible pathogenetic factors include autoimmune antibodies, hypersplenism, and the direct action of viruses.

The observation of hemolysis in the clotted blood specimens and its absence in the oxalated samples apparently presaged the onset of in vivo hemolysis and acute hemolytic anemia. There was a 3-day interval between this finding and the appearance of a detectable drop in the hematocrit; when the latter occurred, hemolysis could be observed in both the clotted and unclotted specimens. The significance of this observation is not understood.

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Ainhum

ROBERT L. CHANCEY, *Major, USAF (MC)*
BERNARD F. GIPSON, *Captain, USAF (MC)*

AINHUM, a chronic disease characterized by the formation of a groove around the base of a digit, usually the fifth toe, leading to eventual spontaneous amputation, is unusual in natives of the United States. Jacobs and associates[1] in a review of the literature up to 1950 found 54 reported cases in the United States and presented one of their own. Most of these cases occurred in southern Negroes. We have located reports of 12 other cases since then.[2–4] We wish to report another instance of this unusual condition seen in a young American Negro who spent most of his life in the Midwestern United States.

CASE REPORT

An 18-year-old Negro was admitted to the hospital 8 July 1955 with the complaint of a painful little toe of the right foot. This man was born in Tennessee. He lived there for 2 years, then moved to the Midwest where he remained until he joined the military service, 4½ months prior to hospital admission. Shortly after joining the military service he developed an "infection" of both feet. A few days later he noted pain on motion of the fifth toe of the right foot. Shortly after this he noted a small crease at the base of this toe. This gradually progressed until there was a deep groove involving the entire circumference of the base of the toe. The toe was painful, especially on walking, but the patient was able to continue with his military duties. The discomfort finally became so acute he sought medical care and was admitted to the hospital.

Family history revealed that the patient's father, one paternal uncle, and two brothers had thickening and scaling of the skin of the palms and soles. There was no other significant family history.

Examination revealed a moderately obese man who did not appear acutely ill. His blood pressure was 110/70 mm. Hg; pulse, 80; and temperature, 98.4° F. There was a deep fissure involving the base of the fifth toe of the right foot (fig. 1) but there was no evidence of any acute process involving the groove. There was hyperkeratosis of the palms and soles with a superimposed apparent dermatophytosis of the feet. The fifth toe of the left foot appeared normal. Oscillometric studies of the lower extremities were normal.

From U. S. Air Force Hospital, Lowry Air Force Base, Colo. Dr. Chancey is now at Beloit Clinic, 1146 Grant St., Beloit, Wis.

Serologic tests for syphilis and a urinalysis were negative. A complete blood cell count was within normal limits. The fasting blood sugar was 102 mg. per 100 ml., and no sickling of cells was noted at the end of 72 hours. Repeated cultures of scrapings from the feet did not reveal pathogenic fungi.

Figure 1. Appearance of the right foot on the patient's admission to the hospital. There is a deep groove in the fifth toe.

A roentgenogram of the right foot showed bony atrophy of the distal portion of the fifth proximal and distal phalanges (fig. 2).

Treatment by soaking in a 1:5000 solution of potassium permanganate produced improvement in the acute inflammation, but the groove involving the base of the fifth toe on the right foot was not influenced. Because of failure to improve on conservative treatment and because of continued pain the toe was amputated on 27 July 1955, and recovery was uneventful.

Pathologic findings

Gross. The toe measured 5.5 by 2.5 by 2 cm. in its greatest dimensions and weighed 11 grams. There was a fibrous band constricting the proximal phalanx. The top of the toe was swollen, blue to grayish in color and scaly. On sectioning, it was found that there was a fracture near the junction of the middle and distal thirds of the proximal phalanx.

Microscopic. Sections revealed severe hyperkeratosis and acanthosis of the epithelium (fig. 3). Although the constricting groove was easily recognizable on the sections there was no evidence of a definite fibrous band. In the subcutaneous tissue there were scattered agglomerations of inflammatory cells consisting mainly of lymphocytes, plasma cells,

Figure 2. The bony changes are quite evident in this roentgenogram of the involved toe, and the circumferential groove can be seen in the soft tissue shadow.

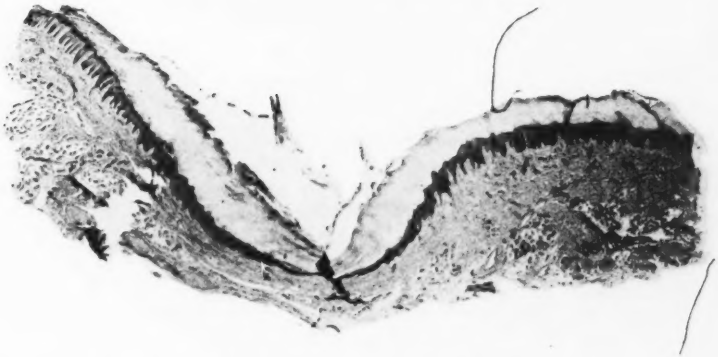

Figure 3. Low-power magnification of section taken through the constricting groove of the toe.

and macrophages. The walls of the blood vessels were thickened and the lumen narrowed, but there was no evidence of obliteration. The

toenail was normal. The bone above and below the groove showed osteolysis and chronic periostitis.

Diagnosis: Ainhum.

DISCUSSION

Many conditions have been implicated as causative factors in ainhum. Among those mentioned[5-8] are leprosy, scleroderma, syringomyelia, pityriasis rubra pilaris, syphilis, hyperkeratosis of the palms and soles, and congenital hereditary factors. In the English language literature it is generally conceded that the cause of this condition is unknown. Shaffer[6] reported a case of ainhum in a white woman with diabetes mellitus and suggested that it was a symptom and not a disease entity. Kean and Tucker,[9] in a review of the literature, suggested three large divisions as regards etiology, *i. e.*, infectious, constitutional, and mechanical. They concluded that the cause of ainhum is unknown and the pathogenesis unclear. The racial factor was considered important. Davis and Hewer[7] suggested that dermatophytosis played a part. The case reported by Jacobs and associates apparently had its onset after a fungus infection of the feet. In the case reported here the annular constriction at the base of the toe occurred following the onset of apparent dermatophytosis of the feet. In addition, the patient presented here had hyperkeratosis of the palms and soles. It is probable that the occurrence of annular constrictive bands of the digits and dermatophytosis is fortuitous rather than the cause and effect.

The histologic picture was nonspecific.

This patient's findings lend further support to the suggestions that ainhum is a symptom which may occur in many conditions and is not a primary disease.

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Unusual Cause of Backache

JOSEPH W. BATCH, *Colonel, MC, USA*
JOHN D. ASHBY, *Lieutenant Colonel, MC, USA*

BACKACHE is a symptom of an organic, or at times a psychogenic condition and is not a disease or a diagnosis unto itself. The complaint of backache is so common that few people reach adult life without having back complaints at some time. The etiologic factors which have been described as responsible for backache are multiple. These include congenital anomalies, developmental defects, postural abnormalities, mechanical strain, trauma, epiphysitis, infections, toxic factors, arthritis, gout, paralytic and functional neurogenic lesions, visceral lesions, muscular and fibrous tissue affections, metabolic, nutritional, endocrine, allergic, climatic, circulatory, hematologic, neoplastic, gynecologic, obstetric, and urologic lesions.[1-3]

The following is a case of backache which recurred following an operation and is considered secondary to it. Although it is not a new cause for backache, the authors have not seen previous reports of similar cases.

CASE REPORT

A 32-year-old officer was admitted to the neurology service of this hospital 26 January 1955, as a transfer from another hospital, complaining of low back pain with radiation of pain to the right hip and down the posterior aspect of the right thigh and calf.

The patient stated that he had been well until June 1942 when he lifted a heavy crate, developing pain in his low back. His back was taped and the pain subsided after 1½ weeks. In April 1943 while on duty in Africa, he fell from a truck, injuring his back. During the same year he had malaria and has had an annual recurrence ever since. Following his fall from the truck he had acute low back pain with radiation down the right leg and was hospitalized for 5 days, receiving conservative treatment. The pain abated and he was discharged from the service 22 August 1944.

In 1946 after helping his father lift a boiler, he again experienced backache with radiation down the right lower extremity. The pain recurred intermittently after this but he was not hospitalized until May 1947 when he was admitted to a Veterans Administration hospital with the diagnosis of a herniated nucleus pulposus between the fourth and fifth lumbar vertebrae. On 21 September 1947 this herniated nucleus

From Brooke Army Hospital, Fort Sam Houston, Tex.

pulposus was excised and a spinal fusion performed to ankylose the third, fourth, and fifth lumbar vertebrae to the sacrum. The patient obtained considerable relief from this operation and was clinically much improved. He applied for and was recalled to active duty 24 January 1952. He was free of pain until March 1954 when, while lifting some heavy equipment in Germany, he had an acute onset of back pain with radiation down the right lower extremity. He was admitted to the hospital 1 November 1954 where conservative treatment, consisting of firm bed, diathermy, massage, and exercises, was given without relief of pain. He was evacuated through medical channels to another hospital in the zone of the interior and later transferred to this hospital, arriving 26 January 1955.

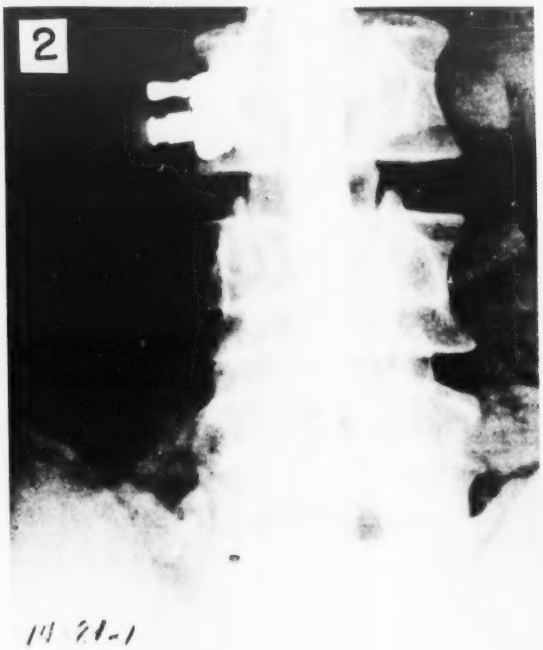
Physical examination on admission to this hospital revealed a well-nourished man who walked with a slight limp and favoring the right leg. He stood with a list to the right. There was a well-healed, 6-inch, longitudinal scar slightly to the left of the midline in the lower lumbar and sacral region. The lumbar spine was semirigid and had less than the normal curve. Flexion, extension, and lateral bending were limited and caused slight discomfort. The apex of motion took place between the second and third lumbar vertebrae. Straight leg-raising tests were positive on the right at 30 degrees above the horizontal and on the left at 40 degrees, producing right calf pain. Deep tendon reflexes were obtained only with reinforcement but were equal bilaterally. The extensor of the great toe on the right was weaker than that on the left. There were no sensory or vascular changes in either lower extremity. There was no muscle atrophy or muscle spasm of the right lower extremity compared with the contralateral extremity. There was no tenderness over the posterior tibial or sciatic nerves bilaterally but marked tenderness over the right superior gluteal nerve and slight tenderness over the lower lumbar spine, most marked at the interspace between the fourth and fifth lumbar vertebrae. Admission laboratory studies, including hematology, urinalysis, and serology, were reported within normal limits.

The admission roentgenogram of the chest was normal. Roentgenograms of the lumbosacral spine demonstrated evidence of the surgically performed spinal fusion extending from the third lumbar vertebra to the sacrum. There were several areas of pseudarthrosis between the fourth and fifth lumbar vertebrae, the fifth lumbar vertebra and the sacrum, and the major bony segment extending from the sacrum up to the fourth lumbar vertebra (fig. 1).

On 31 January 1955 the patient developed a febrile course and was treated for a recurrence of malaria which promptly responded to therapy. On 18 February 1955 he was referred to physical medicine service and placed on therapeutic swimming. A myelogram on 24 March 1955 revealed a marked constriction in the frontal projection and a dorsal filling defect just beneath the lamina of the fifth lumbar vertebra with narrowing of the spinal canal to about 2 mm. (figs. 2 and 3).

Figure 1. Lateral roentgenogram of the lumbar spine demonstrating spinal fusion and areas of pseudarthrosis.

The patient was transferred to the orthopedic service on 28 March 1955 for treatment. On 31 March 1955, under general (open oxygen) ether anesthesia, the previous operation area was explored. It was found that the tibial graft previously used for spinal fusion had united to the sacrum but was ununited proximally and below to the fourth and fifth lumbar vertebrae. This bone was separated from the sacrum with an osteotome and excised along with the fibrous tissue surrounding it. This exposed two fragments of bone extending between the pedicles of the fifth lumbar vertebra corresponding to the position of its lamina. The fragments of bone were irregular in contour and freely movable. The one on the right extended to and surrounded the fifth lumbar nerve root. These fragments of bone were excised by sharp dissection. It was noted that they were compressing the dura and cauda equina. Beneath the bony fragments there was additional cicatricial tissue circumferentially constricting the cauda equina and the right fifth lumbar nerve root. This fibrous tissue was carefully dissected free from the cauda equina and



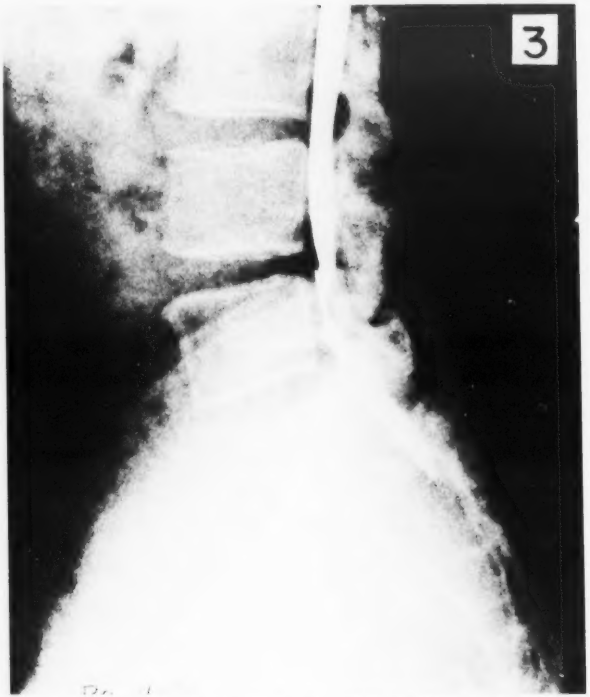


Figure 2. Posteroanterior projection of lumbar myelogram demonstrating constriction at the level of the fifth lumbar vertebra. Figure 3. Lateral projection of lumbar myelogram demonstrating marked narrowing of the spinal canal due to bony projections.

the right fifth lumbar nerve root. The fifth lumbar nerve root on the left and first sacral roots bilaterally were free. The disk spaces between the fourth and fifth lumbar vertebrae and the first sacral vertebra were inspected and injected with one-half ml. of saline and found to be intact. An H-shaped graft was removed from the posterior ilium on the right along with additional cancellous bone. The articular facets between the fourth and fifth lumbar vertebrae and the fifth lumbar vertebra and the sacrum were excised of articular cartilage and cancellous plugs of bone impacted in the defect. The H-shaped graft was placed to fit firmly between the spinous process of the fourth lumbar vertebra and the first sacral segment. Additional cancellous bone was placed about the H-shaped graft to reinforce the fusion, and the wound was closed.

Following surgery the patient was free of the back pain which had radiated down the right leg and his convalescence was satisfactory and uneventful. He was asymptomatic and returned to duty 16 June 1955.

DISCUSSION

The recurrence of pain following operation for herniated nucleus pulposus is frequently stated to be due to an extension of additional disk material from the same disk space to a herniation at another level which may have been overlooked or which developed subsequently following operation or due to cicatricial tissue which may develop around a nerve root subsequent to the surgical intervention. When disk excision is accompanied with an immediate spinal fusion, pseudarthrosis of the fusion is usually considered to be the causative factor producing the continued complaint of back pain.

Our patient had only slight backache; his major complaint was pain in his right hip which radiated down to his right calf. On re-exploration, the L4 and L5 disk spaces appeared normal to inspection and were considered to be intact when not more than 0.5 ml. of saline could be injected into them. There were multiple areas of pseudarthrosis in the previously performed spinal fusion but these were not considered to be the cause of the patient's pain. It seemed that at the time of initial exploration and fusion the major portion of the lamina of the fifth lumbar vertebra had been removed and cancellous bone placed directly on the dura as a bed for a cortical graft. This cancellous graft material produced compression and the formation of a constricting band of fibrous tissue around the cauda equina and fifth lumbar nerve root on the right, resulting in continued low back pain with radiation down the right lower extremity.

This case emphasizes the care that must be exercised in performing a satisfactory spinal fusion so that it does not act as a cause for continued backache. The advisability of performing an immediate spinal fusion at the time of performing laminectomy for displaced disk is questionable.

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Where there is a recurrence of backache with or without sciatic radiation following spinal fusion, the surgeon must consider the fusion as causative in his differential diagnosis and rule it out by obtaining myelograms to determine if there is or is not compression on the cauda equina or nerve roots from the bone mass of the spinal fusion.

SUMMARY

A patient who had backache with radiation of pain down his right lower extremity was benefited initially by exploration and spinal fusion only to later develop slight backache with radiation of pain down the right calf. The spinal fusion was considered to be responsible for producing compression of the cauda equina and right fifth lumbar nerve root with a recurrence of the patient's symptoms. The patient's symptoms were relieved by a second operation.

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THEORETICAL THERAPY

Are we not prone to accept a drug as effective in treatment because it ought to work rather than because it does work? Undoubtedly we are. Is there not a tendency to be convinced that because a drug reduces gastric acidity it does heal gastric ulcers, that because a drug increases cardiac output it benefits cases of heart failure, or that because a drug kills micro-organisms in a Petri dish it will kill them just as well in a living patient? The theoretical and laboratory tests for the effects of treatment are an essential part of clinical research and are responsible for many brilliant advances in therapeutics, and doctors must be on guard against being converted too readily to a line of treatment by theoretical arguments until these are supported by practical clinical tests.

—RICHARD ASHER, M. D.
in *British Medical Journal*
p. 460, Aug. 21, 1954

Rupture of Interstitial Pregnancy With Delayed Diagnosis

ALAN DAVIDSON, *First Lieutenant, USAF (MC)*
JOHN A. HENDERSON, *Major, USAF (MC)*
COURTLAND BERRY, *M. D.*

THIS case is considered worthy of report because it concerns a patient who was operated on for a ruptured interstitial pregnancy about 25 days after it is believed rupture occurred.

CASE REPORT

A 32-year-old woman was admitted to the hospital on 12 February 1955, with the chief complaint of pain of one day's duration in the right upper quadrant of the abdomen and right side of the back. Her last menstrual period had occurred on 26 October 1954, making her 15½ weeks pregnant. She apparently had been well until 1800 hours the day prior to admission, when she suddenly developed abdominal pain. By midnight, the pain had become so severe that she had sought the aid of a local physician. The pain was described as midabdominal and radiating to the right side. The patient was unable to lie on her right side. She was given an injection of 50 mg of demerol (brand of meperidine hydrochloride), which failed to relieve the discomfort, and she remained uncomfortable throughout the night. At 1100 hours the pain became increasingly severe and the patient was admitted to this hospital.

The patient stated that since the onset of pain she had felt weak and had moderate malaise, but had at no time fainted. No vaginal bleeding or uterine cramps were noted. Past history revealed that she had had two normal pregnancies with spontaneous deliveries. She denied any miscarriages or intrauterine manipulations. Systemic review up to the present illness was entirely negative.

Physical examination revealed a thin, well-developed woman in moderate distress. Examination was entirely negative except for the following: Blood pressure, 100/60 mm Hg; pulse, 110, regular and strong. Abdominal examination revealed mild pain to deep palpation in the right upper quadrant and a mass which apparently originated from the pelvis, rose to one cm above the umbilicus and seemed to deviate to the left. There was slight tenderness in both flanks. There was no

From U. S. Air Force Hospital, Patrick Air Force Base, Fla.

rebound tenderness, rigidity, or muscular spasm. The liver, spleen, and gallbladder were not palpable. Pelvic examination revealed a soft, bluish, nondilated cervix. There was no evidence of vaginal bleeding. Bimanual examination confirmed the fact that the abdominal mass was the uterus, which was believed to contain a four-month fetus and a fibroid in the left cornu.

Laboratory studies revealed a hemoglobin of 8.5 g/100 ml, a red blood cell count of 2.02 million, and a white blood cell count of 18,900 per μl with a differential of 94 per cent polymorphonucleocytes and 6 per cent lymphocytes. Sedimentation rate was 20 mm per hour. Urinalysis was negative.

The patient was admitted to the surgical ward with a possible diagnosis of acute cholecystitis. She was placed on absolute bed rest, antibiotics, and mild sedation. The temperature, which had been 100° F on admission, gradually became normal by the next day. The hypogastric and right upper quadrant pain of which the patient initially complained gradually subsided, although there was abdominal tenderness to deep palpation. She had normal bowel movements and no urinary tract complaints. On 20 February, nine days after the onset of illness, the patient complained of mild lower abdominal cramps, and some vaginal spotting was noticed for the first time. On 22 February the bleeding continued and it then became bright red for the first time. The patient developed abdominal cramps and passed some tissue which was sent to the laboratory for examination. The bleeding continued and on 23 February the patient was given a blood transfusion. The bleeding gradually subsided, although the patient continued to have intermittent abdominal pains and cramps and a passage of a moderate amount of blood for the next 10 days. On 7 March the laboratory reported that the tissue specimen was degenerating decidual tissue and blood clot. No intact villi could be identified.

Pelvic examination at this time revealed the uterus to be smaller than it had been on admission. The cervix was 50 per cent effaced and patulous, and there was mild spotting from the os. There was no pain on movement of the cervix. An intravenous pyelogram revealed a fetus lying superior to the bladder (fig. 1). The preoperative diagnosis of abdominal pregnancy, possible ruptured interstitial pregnancy, was made.

On 9 March, 27 days after her initial onset of pain, and after a transfusion of whole blood, an exploratory abdominal laparotomy was performed. In the peritoneal cavity, 300 to 500 ml of old, clotted blood were found. The sigmoid was adherent to the uterus, but was freed by blunt and sharp dissection, revealing a rent in the uterus about 2 or 3 cm in diameter (fig. 2). The sigmoid had apparently sealed off this rent and prevented bleeding from it into the abdominal cavity. Further exploration revealed the fetus lying anterior to the uterus and over the bladder. Inspection of the tubes and ovaries revealed them to be per-

Figure 1. Roentgenogram (pyelogram) with dye in bladder demonstrating fetus in transverse. Its lateral position suggests abdominal pregnancy.

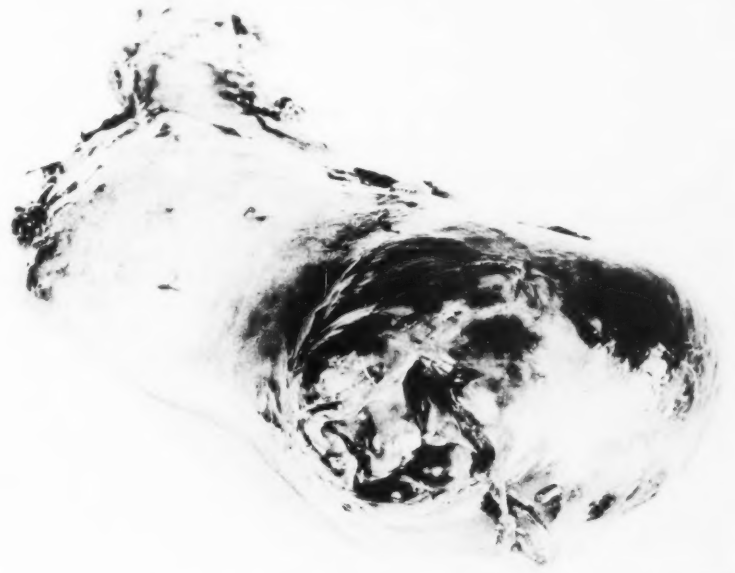

Figure 2. Total abdominal hysterectomy revealing the ruptured area of a 16-week interstitial pregnancy.

fectly normal. A total abdominal hysterectomy was performed. The patient's postoperative course was completely normal, and she left the hospital in good condition on her tenth postoperative day.

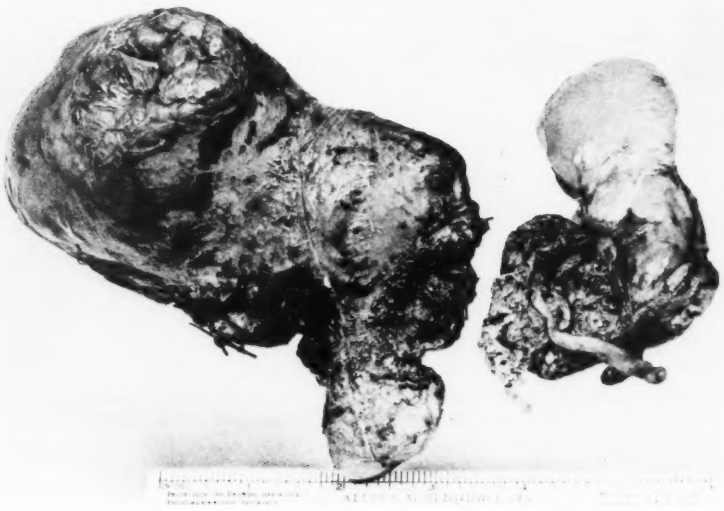

Figure 3. Ruptured interstitial pregnancy: The uterus is on the left; the fetus, adherent to the superior surface of the bladder, is on the right. Tissue adjacent to fetus consists of fatty tissue and blood vessels with a very pronounced lymphocytic infiltration. No placental villi or true decidual tissue are identified.

Pathology Report

Gross examination of the surgical specimen (figs. 3 and 4) revealed a uterus measuring 8 cm in length and 6 cm in width. In the left cornu there was a large mass, dark reddish purple in color and measuring 8 cm in its greatest diameter. The mass was ruptured in one area where irregular nodules of dark reddish purple tissue were identified. Upon opening the uterus, the cervix appeared normal to gross inspection. The endometrial cavity was small and contained a moderate amount of blood clots. An amniotic cavity was identified within the large mass in the cornu.

Microscopic examination of the myometrium adjacent to this area disclosed marked swelling of the individual fibers, with a permanent decidual reaction in some areas. Large numbers of placental villi were noted. The villous processes were surrounded by blood clot and exhibited marked degeneration. The area adjacent to the gross rupture revealed degenerating fragments of decidual tissue and myometrium.

Figure 4. Cross section of uterus showing separate endometrial and amniotic cavities.

SUMMARY

In a case of rupture of an interstitial pregnancy of 16 weeks' gestation, rupture apparently occurred about 1 month prior to laparotomy. Vaginal bleeding occurred for the first time about 10 days after the rupture. At operation the sigmoid was found to be adherent to the opening in the uterus.

It's well known that every university faculty has arteriosclerosis; it is not so well known that the students have it also.—Martin T. Fischer

Multiple Hereditary Cartilaginous Exostoses With Polyposis of the Colon

PETER ZANCA, *Colonel, MC, USA*

THE combination of multiple cartilaginous exostoses and polyposis of the colon is extremely rare. A thorough search was made of the available literature and no identical case report could be found. The closest associated pathologic condition was reported recently by Plenk and Gardner[1] who described osteomatosis, an hereditary disease of membranous bone formation, in conjunction with polyposis of the colon. Nine cases of this type have been recorded.

The bone lesions in the case described herein had their origin in the cartilage cells of the epiphyseal plates; true exostoses, therefore, differ from osteomatosis, which has its origin in disturbed formation of membranous bone.

Whether the combination of multiple cartilaginous exostoses with polyposis is coincidental or is based on a combined hereditary dominant gene is unknown. The geneology of our patient was not investigated.

CASE REPORT

A 40-year-old white woman was admitted to this hospital for removal of polyps of the sigmoid colon. For 3 months prior to admission she had complained of abdominal pain in the left lower quadrant. Past history revealed that for many years she had had multiple exostoses involving the long bones and spine.

Sigmoidoscopic examination failed to reveal any evidence of polyp formation. Routine barium enema with double-contrast air study of the colon revealed two constant, smooth, rounded, radiolucent areas; each measured about 0.8 cm. in diameter and involved the sigmoid colon. The remainder of the large bowel appeared normal (fig. 1).

A skeletal survey showed the skull to be normally developed, and there is no evidence of osseous lesions involving the cranium, facial bones, or bones of the hands, feet, or ribs. Multiple small and large sessile and pedunculated exostoses with cartilaginous tips were seen projecting into the soft tissues bilaterally on the diaphyseal side of the epiphyseal plates of the long bones. These included the tibia, fibula, radius, ulna, and femur. The bony projections extended outward away

From Tokyo Army Hospital, APO 500, San Francisco, Calif.

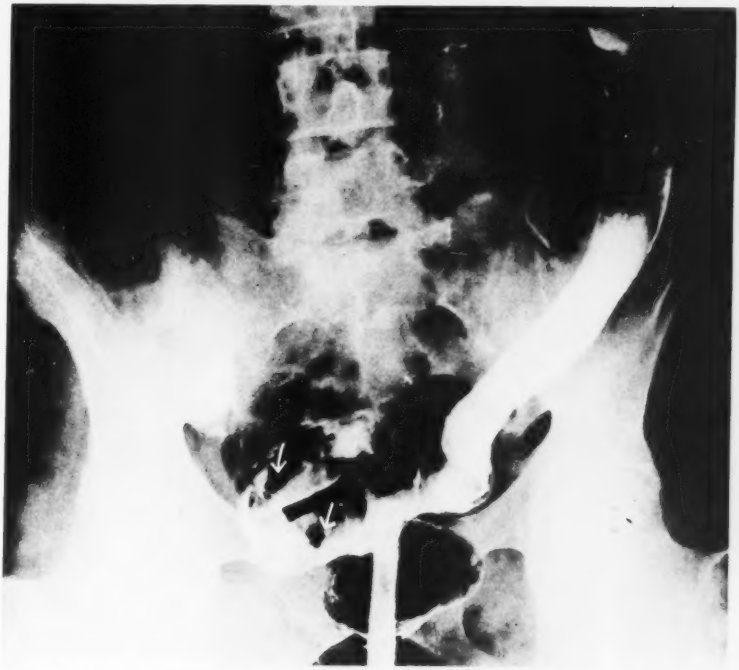

Figure 1. Double-contrast air study of colon demonstrating two smooth, rounded polyps involving the sigmoid flexure.

from the adjacent joints. There was some deformity of the ends of the bones with widening but there was no evidence of shortening (figs. 2 and 3). An osteochondroma protruding laterally from the neural arches of L-4 and L-5 and a small sessile exostosis involving the lateral margin of the right ilium were seen (fig. 4). The roentgenologic findings were characteristic of hereditary multiple cartilaginous exostoses.

At operation, the colon was palpated and no polyps could be felt except those in the sigmoid colon. One polyp was excised and a second was fulgurated with coagulating current. The patient's postoperative course was uneventful. The pathologic report was adenomatous polyp, benign.

DISCUSSION

Plenk and Gardner described the hereditary pattern of osteomatosis (leontiasis ossea) associated with polyposis of the colon. Four of six of their patients had cranial or facial bone osteomas plus cortical changes in the long bones. The authors noted that the associated changes in the long bones were unusual and interesting. These tumors, however, consisted of solid bone and lacked

Figure 2. Multiple cartilaginous exostoses involving the distal ends of the femur and proximal ends of the tibia and fibula.

"areas of cartilage." They concluded that, in their cases, the changes in the long bones were confined to periosteal bone formation and that "a disturbance of membranous bone formation" is the causative basis of the disease. The authors cite Billings and Ringertz,[2] who reported a patient with tumor of a rib, and Reiss,[3] who mentioned the femur as being involved in three patients and the fibula in one.

In our patient the changes involving the long bones and spine presented the typical characteristic findings of hereditary, benign, multiple cartilaginous exostoses. Radiographically, the osteochondromatous tumors presented the classical bone projections with rarefied cartilaginous tips. There was no evidence of leontiasis ossea or of cranial, facial, or rib involvement. Two benign polyps were surgically removed, one of which was studied by the

Figure 3. Multiple cartilaginous exostoses involving the distal ends of the radius and ulna.

pathologist. On palpation the surgeon was unable to locate any other polypoid lesion in the colon, and the routine barium enema and double-contrast air examination failed to demonstrate any other lesion in the colon.

Multiple cartilaginous exostoses is known as a congenital and hereditary disease which involves bones ossified in cartilage and which, as a result of defective modeling of the bone, results in osseous deformities with exostoses.

The development of polyposis of the colon is based on a familial predisposition to this disease. The polypoid lesions may be found in early childhood but frequently are not diagnosed until later life. In view of the absence of any underlying inflammatory disease of the large bowel, the polyp formation in this patient is considered as being of hereditary origin.

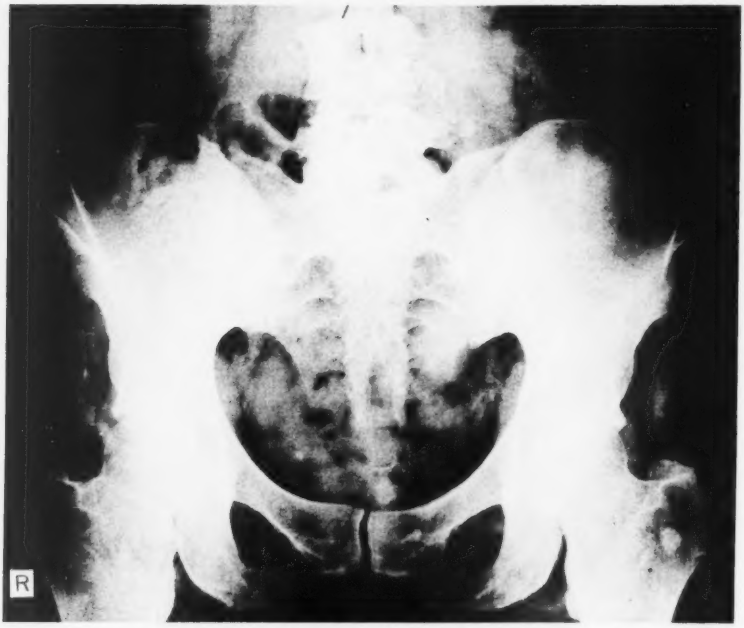

Figure 4. An osteochondroma involving the neural arches of L-4 and L-5 is clearly demonstrated.

SUMMARY

A case of hereditary multiple cartilaginous exostoses associated with polyposis of the colon is reported. No identical case description could be found in the available literature.

The pathologic condition most similar is that of osteomatosis (leontiasis ossea) with polyposis of the colon. The latter disease has a hereditary pattern. The geneology of the patient was not investigated.

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Clinicopathologic Conference

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ANURIA

Summary of Clinical History. This 33-year-old white male of Latin-American extraction was admitted to the hospital 18 April 1952 with the chief complaints of anuria and Hansen's disease.

The patient was well until 5 April. At that time he had a temperature of 101° F, which continued for three days. He then developed diarrhea and abdominal cramps which lasted until 12 April, when he felt well but weak. On 13 April he developed hiccoughs. Two or three days prior to the onset of the present illness the patient had consumed several beers. He also told his wife that for three weeks prior to onset he had been cleaning motors at work with a "gas" which he thought was carbon tetrachloride. He further stated that several of his fellow workers "felt sick."

The patient was an electrician. He had had military service in North Africa and Italy during World War II, and was discharged in 1944. He used alcohol occasionally and did not use tobacco. He had been given diasone (brand of sulfoxone sodium) therapy at Carville, La., until 1947 and intermittently after that by a local physician. His last medication had been in the preceding December. His father died of heart disease; his mother, two siblings, wife, and child were living and well. There was no other history of familial diseases. The patient had a slight shrapnel wound on the leg in World War II, and had had no operations. He had had the usual childhood diseases, and pneumonia in 1944. Hansen's disease was diagnosed in 1943. He was discharged from Carville in 1947 as an arrested case.

Review of systems was negative except for the genito-urinary system. The patient had had a "mild kidney disease" of unknown type in 1946 while at Carville. Several months prior to the pres-

*Brig. Gen. Stuart G. Smith, MC, USA, Commanding General. From the Laboratory Service, Col. Carl J. Lind, MC, USA, Chief.

ent illness he had noted a sharp, "knife-like" intermittent pain in his right side. He also noted swelling of feet, nausea, vomiting, and a bad taste in his mouth. His urine showed pus and blood. He was treated with penicillin and the symptoms subsided.

Physical Examination. The patient was a well-developed, well-nourished Latin American appearing acutely ill, slow in speech, and confused in thought. He was 5 feet 10 inches in height; his weight was 185 pounds average, 208 pounds maximum, and 189 pounds at the time of examination. His pulse was 108, respirations, 26; temperature, 99.8° F; and blood pressure, 142/88 mm Hg. Head, neck, eyes, ears, teeth, and throat were negative. His tongue was dry and hard, and there was a uriniferous odor to his breath. Chest expansion was equal and normal bilaterally. The lungs were clear to auscultation and percussion, and the heart was entirely normal. There were no masses or tenderness in the abdomen, and no hernias. The genitalia were those of a normal adult male, and the rectum and prostate were normal. There was definite bilateral costovertebral-angle tenderness. Examination of the extremities was negative. The nervous system was normal except for a clouded sensorium. There were areas of raised macular lesions over the skin of the chest, abdomen, and flanks. A slight icterus was also noted. The lymphatic system was normal.

Course in Hospital. The patient was catheterized on the day of admission and 5 ml of dark urine were obtained. On 19 April scrapings of skin lesions of the chest were positive for acid-fast bacilli. The patient was dialyzed in an artificial kidney for 6 hours and 15 minutes on 20 April. On 22 April his general condition was improved and sensorium cleared. A biopsy of the liver (by needle puncture) was done and reported as follows: "This presents a rather unusual picture. There is marked pleomorphism of liver cells suggesting a remarkable degree of regeneration. The appearance is not typical for either toxic or viral hepatitis. There is, in addition, a considerable degree of arteriolosclerosis and we wonder whether the patient has hypertension." On 30 April the patient was running a 99-100° F temperature, but otherwise was feeling well. A biopsy of the skin was reported as showing Hansen's disease. The following day the urine showed many bacteria. Temperature was responding to penicillin, and the patient was quite alert. By 9 May, however, the patient was running daily fevers. The skin showed exacerbations of lepromatous lesions. Tender nodes were noted in the right groin. Fluids were forced in an attempt to bring down the blood urea nitrogen and the nonprotein nitrogen. By 26 May, the temperature was 102° F, and there were marked exacerbations of skin lesions. The patient was running a spiking temperature on 28 May. No foci of infection were found. The sensorium was

cloudy and movements were sluggish. On 6 June his condition was the same. Dependent edema was noted. The next day the patient had an urticarial reaction to a blood transfusion. The reactions responded to Benadryl (brand of diphenhydramine hydrochloride). On 9 June the urinary output dropped below 500 ml. Temperature, however, was normal, and the skin lesions were less noticeable. On 12 June the patient was drowsy and sluggish. Output was zero. On 18 June the patient was running a rapid downhill course. Dependent edema was increasing. He was extremely weak and lethargic on 20 June and experienced two severe Jacksonian convulsions. On 21 June he was dialyzed in an artificial kidney for 8 hours and 15 minutes. The following day his general condition was the same, and on 23 June his mental condition was less confused. The urinary output was scanty. On 24 June he had several severe convulsions. On 29 June his convulsions were poorly controlled by sedation, and he died on 7 July, 80 days after admission to the hospital.

Laboratory Studies. Electrocardiograms on 18, 19, 21, 22, and 23 April showed normal tracings. On 26 April there was a borderline tracing. The pattern was not diagnostic, but was compatible with electrolyte imbalance. On 29 April and 1 May the pattern was the same. Tracings of 16 and 19 May were normal. On 13 June the tracing was abnormal, with prolonged Q-T interval, T-wave changes, and low voltage suggestive of hypokalemia. Tracing of 20 June showed slight regressive changes from that of 13 June.

On 11 June a blood smear showed marked hyperchromia, marked anisocytosis, and slight poikilocytosis. On 19 April the serum bilirubin was 0.8 mg per 100 ml; total protein, 4.1 (albumin 3.1, globulin 1.0) grams per 100 ml. On 22 April the serum bilirubin was 0.4 mg per 100 ml; total protein, 4.2 (albumin 2.0, globulin 2.2) grams per 100 ml. The thymol turbidity was 1.25; cephalin-cholesterol flocculation was negative. Total cholesterol was 281 mg per 100 ml on 12 June.

Urinalyses consistently showed 2 to 3 plus albumin; the sugar was negative. Microscopically, there were 10 to 20 white blood cells and 5 to 20 red blood cells per high power field. Occasional bacteria were noted. On two occasions the urine was grossly bloody.

The hematologic findings and excretion and electrolyte studies made during the period of hospitalization are summarized in tables 1 through 3.

Investigation by authorities at the patient's place of employment revealed that the cleaning material used was trichloroethylene, in the cold state. The cleaning operations were conducted in essentially open space. Halide detection tests indi-

TABLE 1. *Hematologic findings*

Date	White blood cells/μl	Polymorphonucleocytes (%)	Lymphocytes (%)	Red blood cells/μl	Hemoglobin (g/100 ml)	Hematocrit (ml/100 ml)
18 April	13,900	78	20	–	12.0	38
22 April	–	–	–	–	11.5	36
7 June	17,400	92	8	–	7.0	–
9 June	–	–	–	–	9.0	–
11 June	11,100	76	24	2,300,000	7.0	–
13 June	–	–	–	–	16.0	–
17 June	–	–	–	–	18.0	–
5 July	29,000	94	6	2,700,000	8.0	–

TABLE 2. *Excretion studies*

	Urea clearance (ml/min)	Creatinine clearance (ml/min)	Intake (ml)	Output (ml)
Normal	+80	+120		
18 April	–	–	2,000	0
19 April	–	–	0	150
20 April	–	–	50	0
21 April	–	–	600	0
22 April	–	–	700	0
23 April	–	–	750	300
24 April	–	–	1,600	600
25 April	–	–	1,100	850
28 April	–	–	1,700	600
29 April	1.9	2.5	2,000	2,000
30 April	–	–	3,250	1,700
1 May	–	–	2,680	3,300
2 May	5.9	6.6	2,730	3,190
3 May	–	–	2,160	2,350
6 May	3.0	3.8	–	–
9 May	3.7	5.5	–	–
13 May	4.5	5.1	–	–
16 May	8.7	8.5	–	–
20 May	14.8	14.7	–	–
27 May	6.1	6.3	–	–
9 June	–	–	–	500
17 June	3.1	3.2	–	0
23 June	–	–	–	100

TABLE 3. *Electrolyte studies*

	Sodium (meq/l)	Potassium (meq/l)	Chloride (meq/l)	CO_2 (meq/l)	Blood urea nitrogen (mg/100 ml)	Creatinine (mg/100 ml)	Nonprotein nitrogen (mg/100 ml)	Phosphorus (mg/100 ml)
Normal values	135-137	3.5-5.5	100-110	25-30	10-20	1-2	25-40	4.0-6.5
18 April	119	5.3	131	15.5	264	–	–	–
19 April	109	3.5	124	10.8	244	–	–	–
20 April:								
Predialysis	116	4.8	80	9.5	205	14.5	–	9.42
Postdialysis	128	3.6	94	18.5	57	5.56	–	3.0
22 April	133	3.6	93	22.5	62	8.22	–	4.53
25 April	137	4.3	95	20.0	53	13.9	–	–
29 April	127	4.3	95	–	127	–	157	–
2 May	133	4.2	104	15.7	110	11.2	–	–
6 May	132	4.3	103	14.6	122	11.4	–	–
9 May	132	4.7	103	11.3	134	12.0	155	–
13 May	137	5.3	106	12.4	91	11.5	155	–
16 May	144	5.5	107	15.3	77	8.14	107	–
20 May	138	5.4	112	18.1	54	–	70	–
27 May	133	4.9	114	16.7	56	5.99	–	–
12 June	124	4.8	96	14.8	77	12.0	–	–
21 June:								
Predialysis	127	5.3	103	13.7	111	11.0	129	–
Postdialysis	130	3.4	101	22.8	45	4.0	48	–
24 June	122	4.7	94	19.0	57	9.3	–	–
27 June	122	4.5	87	18.0	58	9.9	–	–
1 July	122	4.7	–	15.0	65	10.7	–	–

cated that the concentration of trichloroethylene vapors in the atmosphere directly over the cleaning tank was less than 50 p. p. m. No concentration of the vapor could be detected in the working area immediately adjacent to the vat. Thirty other workers had been engaged in similar operations for months with no toxic manifestations.

DISCUSSION

Doctor Hayman:* It is a very great pleasure to be here, as it is to go to any Army hospital. You always learn more than you teach, I think. I was made an expert in tropical medicine by order of the Surgeon General, but not on the basis of any previous training. Unfortunately for this afternoon's discussion, there were not very many cases of leprosy in the American Army, at least not that I came in contact with.

This man was 33 years old. He was admitted in April with a diagnosis of anuria and Hansen's disease. He had been discharged from the Army with a diagnosis of leprosy in 1944; he had been treated at Carville intermittently with diasone, and had been discharged as an arrested case. He apparently got along quite well until between 5 and 8 April when he had some kind of febrile illness with a few days of diarrhea and abdominal cramps, followed by some further malaise. That was about all until admission to the hospital. Further history I take it was developed on further questioning after admission because of urinary tract disease and anuria. On admission his general physical

*Joseph M. Hayman, Jr., M. D., Professor of Medicine, Western Reserve University School of Medicine, Cleveland, Ohio.

examination was essentially negative except for areas of raised macular lesions over the skin of the chest, abdomen, and flanks, and a slight icterus. The maculopapular lesions were regarded, I take it, as characteristic of nodular leprosy. He was catheterized on the day of admission and 5 ml of dark urine was obtained. The diagnosis of Hansen's disease was confirmed by scrapings. Further study of the biopsy of the liver was done, which was reported as showing a rather unusual picture with pleomorphism of liver cells suggesting a remarkable degree of regeneration. The biopsy findings apparently had the pathologist confused because he said they were not typical for either toxic or viral hepatitis, that there was a certain degree of arteriolosclerosis, and he suggested that the patient might have hypertension; this, however, had not been brought out by his physical examination, his blood pressure being 142/68 mm Hg. Furthermore, examinations of the urine showed the constant presence of albumin and a low total volume, and blood studies showed a marked degree of nitrogen retention.

Let us look at the electrolytes. Compare the values given on 18 and 19 April with the predialysis figures on the 20th. The chlorides came down and the carbon dioxide came down too. In other words, he was a little bit worse. Well, the sum of the cations and anions have to be equal, do they not? And usually when you add sodium and potassium, which make up the bulk of the cations, together, and then add the chlorides and carbon dioxide, which are the most important of the anions, your sum of chloride and carbon dioxide is 20 meq or so less than the cations because you do not determine sulfates and phosphates, and base them on the proteins. The thing that impressed me in reading this protocol is the results of the first two days, 18 and 19 April. The sum of the cations is about 124 meq, and the sum of the anions that are given is 146. Well, when you are leaving out sulfates and phosphates you cannot possibly have enough calcium and magnesium to make up the difference, so some of those figures are bound to be wrong. That just cannot be. Now the analysis that is reported on 20 April (116 for sodium and 4.8 potassium, a total cation given us of 120.8 and 89 for total anion) is much more reasonable. The difference there could well be made up in anions by basebound proteins plus sulfates and phosphates. In other words, just because you are handed out a whole flock of laboratory figures does not necessarily mean you have to accept them. You have to scrutinize them a little carefully and see if they are reasonable.

You all know the effects of dialysis on the kidney, and I do not think we need to spend time on that. The patient responded beautifully to the first dialysis with a drop in his blood urea nitrogen to approximately one quarter of what it was, and then a gradual increase until 21 June when he was again in uremia and was dialyzed again.

As far as his leprosy goes, he had been treated at Carville with diasone. Do you know what kind of a compound diasone is? It was

introduced first for use in tuberculosis and was not very good. Then it was used in the treatment of leprosy with a fair amount of success. It falls into the group of sulfonamides. We have no information as to where this man got his leprosy, but it was some years before he got into the Army. During this acute illness and his stay in the hospital with uremia, he had a recrudescence of his leprous lesions. That is very common in leprosy; it is spoken of as a lepra reaction and occurs both in the tuberculoid and lepromatous types. It interested me that it could recur in a man, discharged from Carville as arrested, when he gets some complicating febrile illness. Now, when this man was admitted he gave a history of having drunk some beer a few days before his febrile illness, which would raise the question of whether he had toxic nephritis, or so-called lower nephron nephrosis from some contamination of the beer he had drunk. He also gave the history of having worked for three weeks cleaning motors with a gas which he thought was carbon tetrachloride. Further investigation showed that it was not carbon tetrachloride but trichloroethylene. The question is: Was his anuria and his azotemia due either to poisoning from some chemical solvent used in cleaning these motors or to some contamination of the beer he had drunk? The picture he presented on admission of a man in reasonably good shape with a normal blood pressure, a marked oliguria, and uremia would be consistent with a tubular poisoning and could have been due to either carbon tetrachloride or some other poisoning. But there are a couple of points that may exclude that, at least tentatively.

Is there anything in the history of this man's initial illness on 5 April—with a temperature of 101° F for three days, diarrhea, abdominal cramps, and then a feeling of weakness and hiccough—that would make you think that his subsequent renal lesion was not due to poisoning by chemicals? The majority of victims of carbon tetrachloride poisoning come in afebrile. The fact that onset in this man was with fever and diarrhea that subsided in one day and then with other symptoms that subsided spontaneously made me feel that his renal lesion was probably not due to poisoning.

Now, if we go back into his history a little bit further as it is given in the protocol, we find that he had some kind of kidney disease at Carville in 1946 which apparently he got over spontaneously, and that he had a type of pain in his right side with pus and blood in his urine in 1951 for which he was given penicillin and from which he recovered.

Then in 1952 we have this acute onset of fever, transient diarrhea, hiccoughs, and rapidly developing uremia. We know the man had leprosy. It seems to me the question to be decided is whether or not his anuria and his death were due to a renal lesion which was a complication of his leprosy, or whether the renal lesion which killed him was entirely unrelated to his leprosy. Nephritis is mentioned as a complication of untreated leprosy. It is stated that many persons with

leprosy die of nephritis, but in no place could I find any description of what the renal lesion was.

It seems perfectly reasonable, however, that in a chronic infectious disease such as leprosy a certain number of people might develop amyloid and might develop renal amyloidosis and die of renal insufficiency as a result of amyloid deposits in their kidneys. If this man's leprosy was pretty well arrested—I do not think we can assume it was completely arrested or he would not have had this reaction during his hospital stay—but if we assume that it was fairly well arrested, I would not expect him to go along and develop progressive amyloid disease. Moreover, amyloid disease, as far as I know, would not account for the three bouts of kidney involvement—the one in 1946 while he was in Carville, this one in 1951 that from the description sounds like either glomerulonephritis or pyelonephritis, and finally this terminal bout. He had no hypertension, so that rules out arteriolar nephrosclerosis as a cause of chronic kidney disease. The intermittence of his attacks, the severity of them when they did occur, and the absence of hypertension I think make a chronic glomerulonephritis extremely unlikely. That leaves us with the question of a chronic recurrent pyelonephritis as a possible explanation. Certainly the second attack in 1951 is reasonably characteristic of a type of pyelonephritis, either with or without stone; and the onset of this final attack with fever and cramping abdominal pain, plus or minus diarrhea, is not inconsistent with an acute bout of pyelonephritis.

There is one thing which is lacking in the protocol which I would like very much to know. That is, I could find no mention of the specific gravity of the urine at any point. His urine volumes were zero, then 150 ml, and then there were three days of anuria. Then his urine volume increased up to a normal range of 2,000 ml or more, and for some time he apparently was holding his own because about that time his blood nitrogen was not increasing. That is consistent with tubular damage and he should have had a low specific gravity. Then for some reason or other, when he apparently was getting along pretty well, it seems that he became oliguric again and again, and ended up with what approximated anuria. It is rare in tubular damage to have a person begin to recover, get their urine volume up to 2,000 ml, and then relapse, but it does occur. Tubular damage can occur in chronic pyelonephritis, particularly if there has been any obstructive lesion of the ureters and the prostate. Tubular damage from obstruction is reversible, and recovery may occur.

There is another point in the laboratory protocol that may be worth commenting on. The urea and creatinine clearances are extremely low. As you see at the top of the column the normal urea clearance is about 80 ml per minute and the creatinine about 120, yet his creatinine clearance was down to 2.5 ml with a urine volume of 2,000 ml. Two thousand ml would be about 0.6 ml per minute, and if his clearance was only 2.5 ml it would mean that about 25 per cent or more of the volume of

glomerular filtrate appears in the urine, which is unbelievably high. Normally, you know, the urine volume is only 1 or 2 per cent of the volume of glomerular filtrate. I question the value of any clearances which are down in the range of under 10 ml. I think all you can say is that his clearances were very low.

In my opinion this man had leprosy, mostly the lepromatous type, and according to the record showed some recent exacerbation of his lesions. He also had an extensive renal lesion which may be amyloid, but I am more inclined to think it will show chronic pyelonephritis. Whether any obstructive lesion will be demonstrated or not, I do not know.

Dr. Hayman's diagnoses:

1. Hansen's disease, lepromatous type
2. Chronic pyelonephritis, possible amyloidosis

PATHOLOGIC FINDINGS

Doctor Kellenberger:* Concerning the possibility that this man had trichloroethylene poisoning, I think he may well have had, considering the sick feeling which he and the other men at work experienced. Preparations of the drug used therapeutically seldom have toxic effects. However, commercial products are known to cause side effects. Hamilton[1] has reviewed this subject, and fatalities are encountered. Central nervous system symptoms and gastrointestinal symptoms are most commonly encountered. The difference between therapeutic and commercial products seems to be in either intrinsic impurities or dissolved hydrocarbons. Only occasionally cases of jaundice and hepatitis are reported, and these are probably reactions to impurities.

At autopsy the skin presented only a few whitish areas on the chest. Sections through these showed a lepromatous type of leprosy.

The liver was enlarged, weighing 2,500 grams, and appeared congested. Microscopically, it showed severe congestion and the small arteries showed amyloid deposits, which in retrospect represented the same findings that were erroneously interpreted as sclerosis consistent with hypertension (fig. 1).

The spleen weighed 350 grams and grossly had the appearance of congestion. Microscopically it showed congestion and amyloid deposits throughout the red pulp.

The prostate contained an abscess 1.5 cm in diameter that appeared microscopically to be of an acute bacterial nature.

One testicle was normal but the other on cut section presented patchy areas of fibrosis. Microscopically, the section showed only a patchy fibrosis and atrophy without evidence of leprosy or amyloidosis. Grabstald and Swan[2] have recently reviewed the subject of tes-

*Capt. Robert E. Kellenberger, MC, USA, Laboratory Service.

ticular atrophy in leprosy and believe that atrophy is the final result of acute leprous orchitis.

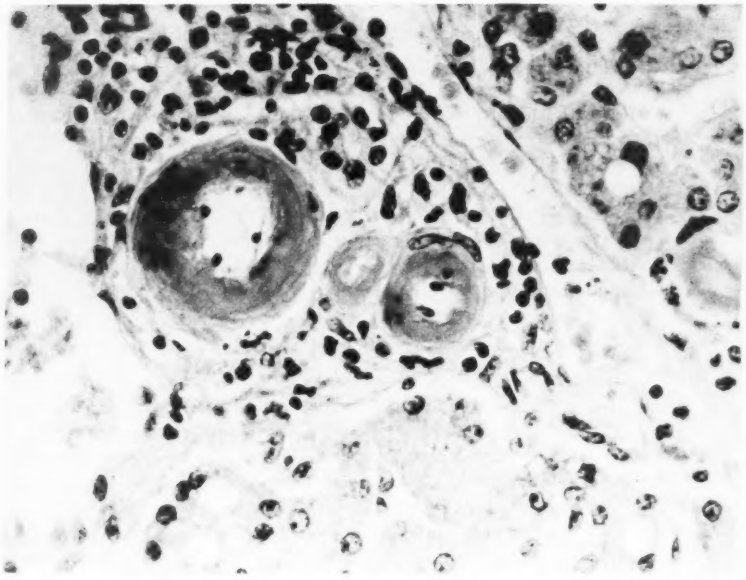

Figure 1. Section of portal area of liver with amyloid in wall of small artery. This finding had been thought on biopsy to be evidence of hypertension. (Hematoxylin and eosin stain, × 475)

The kidneys each weighed 200 grams and were slightly larger than normal. The capsules stripped with ease, leaving smooth, mottled yellow-red cortices. Cut sections revealed loss of normal architecture with indistinctness of the corticomedullary borders. Throughout the cut sections there were large, poorly defined yellow-tan areas firm in consistency and waxy in appearance. Microscopic examination (fig. 2) showed almost complete replacement of the glomeruli by a homogeneous, acellular substance which took both Congo red and crystal violet stains positive for amyloid. There were numerous vessels and tubules which likewise showed amyloid deposits. The kidneys did not show inflammation.

Microscopic examination of the gastrointestinal tract disclosed amyloid deposits in the basement membranes of the mucosal glands. The thyroid presented marked interstitial amyloid deposits, as did the adrenal. The small arteries of the pancreas contained mural deposits of amyloid. There was no amyloid noted in the heart, lungs, lymph nodes, or tongue. Gingival tissue was not removed at autopsy.

Amyloidosis is a fairly common complication of leprosy. Strong[3] reviewed a report from the Philippine Islands in which 16 per cent

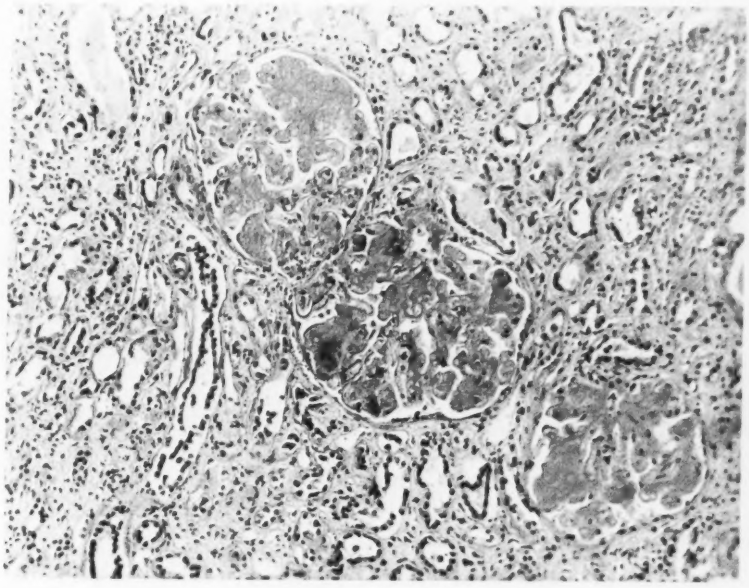

Figure 2. Section of kidney, showing replacement of glomeruli with amyloid. (Hematoxylin and eosin stain, × 105)

of the patients died of nephritis that in most cases was amyloidosis rather than true inflammation.

Pathologic diagnosis:

Renal insufficiency due to amyloidosis secondary to leprosy

Doctor Hayman: I think this was a most interesting demonstration. The deduction made from this side of the room that sulfonamide or diasone poisoning might have been responsible for the patient's initial lesion I think was a good one, and one which I thought about for a while. But he had had his last dose of diasone somewhere back in 1947 and no symptoms until 1952. That is too long. Certainly the gross appearance of the kidney would indicate immediately that these kidneys were not the site of a chronic recurrent pyelonephritis. The histologic picture of the extensive amyloid disease I think means that he might have had a slowly progressive renal insufficiency over a long period of time, and the acute episode on 5 April probably had nothing particularly to do with his developing uremia but was simply some intercurrent infection of some kind, making diagnosis more dif-

ficult. It was an example, I think, of how long a man can go gradually developing uremia without any symptoms, because to have gotten his degree of uremia from a glomerular lesion or reduction of nephrons it must have been going on for months rather than days, as you get uremia from a tubular lesion.

I have certainly learned something and I am very much indebted to you.

Doctor Lind: I might add one last paragraph. We have a letter from Doctor R. R. Wolcott who was director at that time of the Public Health Service Hospital at Carville and he says, "Experience here does not indicate that the sulfone drugs cause kidney damage. This is not the ordinary sulfa drug, it is a sulfone. Most of the renal impairment adjudged clinically and at the autopsy table was a part of widespread amyloidosis which often complicates a long-standing leprous infection. Necrosis caused by amyloid disease is one of the leading causes of death in patients with leprosy."

REFERENCES

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NO ANATOMIC CAUSE OF DEATH

Autopsies which do not reveal a plain cause for death or in which there are trivial, equivocal or even no positive findings are a source of perplexity to the pathologist who earnestly seeks to establish a real reason for death. Mild degrees of natural disease may be present as the only finding. Meticulous elimination of other possibilities is essential before death can be ascribed to such natural disease. Changes which are the result of the dying process must be fully screened and evaluated lest they be assigned a causative role. Behind every unexpected death lurk innumerable possibilities which may escape detection unless a painstaking and thorough search is made. The task may be of Gordian complexity, but it is not to be solved by intuition or a few strokes of the knife.

—LESTER ADELSON, M. D.
in *Connecticut State Medical Journal*
p. 733, Sept. 1954

A MESSAGE FROM THE A. M. A.

It is found not infrequently that physicians in civilian practice are not conversant with the varied activities and services offered by the American Medical Association. What is the American Medical Association—Why does it exist—How is it organized—How does it function—How are its policy positions determined on national matters which affect the medical profession—What does it offer to physicians and the public?

Physician members of the Association should know the answers to these and similar questions concerning their organization. It is important to realize that the average practicing physician is the local representative of the American Medical Association to his patients, his friends, business associates, and his community. He is the A. M. A. to them.

A number of physicians, when called into active service with the Armed Forces, desire more information about their association and show more interest in its activities. For these reasons, this and subsequent articles to appear in the *U. S. Armed Forces Medical Journal* will be devoted to exploring the American Medical Association; its organization, function, history, and purpose.

The American Medical Association was founded on 5 May 1847, when 250 delegates representing more than 40 medical societies and 28 colleges, embracing medical institutions in 22 states and in the District of Columbia, met in the hall of the Academy of National Sciences in Philadelphia, Pa. Its first president was Dr. Nathaniel Chapman of Pennsylvania. In the past century, the American Medical Association has grown from an organization of a few thousand to a membership of more than 155,000 physicians of 1,911 component county and district medical societies and 53 constituent state and territorial medical associations. Its influence has expanded from that of a medical debating society to a world leader in medicine and a respected voice in American affairs.

The Association has as its objective the promotion of the science and art of medicine and the betterment of public health. It is a physicians' organization existing to serve the physician and the general public.

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense. —*Editor.*

Each component county medical society, on the basis of provisions set forth in the constitution and bylaws of its respective state, selects delegates to represent that county in the House of Delegates of the state medical association. In turn, each state and territorial medical association selects one delegate per 1,000 A. M. A. members, or fraction thereof, to represent that state in the House of Delegates of the A. M. A. In addition, as provided in the bylaws, the House of Delegates includes representatives of the federal medical departments of the armed services, Veterans Administration, and the U. S. Public Health Service. The House of Delegates, composed of 192 physicians, meets semiannually. It is the policy-making body of the Association. The House of Delegates elects seven officers and nine trustees. The Board of Trustees, the President, and the President-Elect serve as the interim governing body of the Association.

A physician may be an active, associate, service, or affiliate member of the American Medical Association. Provisions are also made for the election of honorary members.

Active membership is limited to those members of constituent associations who hold the degree of Doctor of Medicine or Bachelor of Medicine and who are active members of their constituent association with the right to vote and hold office. Service membership may be held by regular commissioned medical officers of the Army, Navy, Air Force, or U. S. Public Health Service, including reserve officers of the U. S. Public Health Service on active duty, who have been nominated by the Surgeons General of the respective services. The permanent medical officers of the Veterans Administration and the Indian Service, who have been nominated by their Chief Medical Directors, may likewise become service members. Service members retain membership as long as they are on active duty, and thereafter, if they have been retired in accordance with federal law and do not engage in active practice.

Only active and service members of the Association have the right to vote and the privilege to hold office.

Membership dues, which include a subscription to the Journal of the American Medical Association, are $25 annually. Annual dues are recommended by the Board of Trustees and approved by the House of Delegates. Dues will be remitted 1 January or 1 July following the date of entrance into military service to all members temporarily in the Armed Forces and the U. S. Public Health Service, regardless of local dues exemption.

In the next and subsequent issue of the *Journal* some of the Councils, Committees, Bureaus, and Departments of the American Medical Association and their activities will be discussed.

PROMOTIONS OF OFFICERS

The following officers of the military medical services on active duty in the Army, Navy, and Air Force have recently received *permanent* promotions to the rank indicated:

Medical Corps

James D. Amos, Maj., USA
Theodore Bacharach, Maj., USA
Stewart L. Baker, Jr., Maj., USA
Robert J. Barnett, Maj., USA
Roberto E. Benitez, Maj., USA
Robert Bernstein, Maj., USA
Raymond W. Blohm, Jr., Maj., USA
Edward S. Bres, Jr., Maj., USA
George T. Britton, Maj., USA
Harry E. Burkett, Capt., USA
John W. Burkett, Maj., USA
Bruce L. Bushard, Maj., USA
Thaddeus W. Cap, Maj., USA
Joseph Castago, Maj., USA
George H. Chambers, Maj., USAF
Ralph W. Clemments, Maj., USA
John J. Coffey, Maj., USA
Nicholas F. Conte, Maj., USA
Ray G. Cowley, Maj., USA
Elmer V. Dahl, Maj., USAF
Estill N. Deitz, Maj., USA
James F. Donovan, Maj., USA
Warren D. Eddy, Jr., Maj., USA
David J. Edwards, Maj., USA
Henry F. Fancy, Maj., USA
Carl A. Fischer, Maj., USA
Russell J. Gale, Maj., USA
Samuel C. Gallup, Maj., USA
Emil J. Genetti, Lt. Col., USA
Russell E. Graf, Maj., USA
Dell M. Gray, Maj., USA
James D. Green, Maj., USA
James L. Hansen, Maj., USA
Frederick G. Harris, Maj., USA
Harry McC. Henderson, Jr., Maj., USA
Euclid G. Herndon, Jr., Maj., USA
John A. Jenicek, Maj., USA
Robert E. Johnston, Maj., USA
Augustus B. Jones, Jr., Maj., USA
Irvine G. Jordan, Jr., Maj., USA
Donald J. Joseph, Maj., USA
Roger A. Juel, Maj., USA
Allen F. Kingman, Jr., Maj., USA
Charles W. Kraul, Maj., USA
Frederick F. Krauskopf, Maj., USA
Edward A. Langdon, Maj., USA
Samuel Lee, Maj., USA
Authur E. Levy, Maj., USA
James E. Lewis, Maj., USA
Herbert L. Ley, Jr., Maj., USA
Charles K. Liddell, Maj., USA
Albert B. Lorincz, Maj., USA
William F. MacDonald, Maj., USA
David E. MacQuigg, Maj., USA
Sidney L. Marvin, Maj., USA
Stephen G. May., Maj., USA
Marion E. McDowell, Maj., USA
Worthy W. McKinney, Maj., USA
William H. Meroney, III, Maj., USA
Frank L. Miller, Maj., USA
James B. Moffett, Maj., USA
Loran E. Mott, Maj., USA
Irvin C. Plough, Maj., USA
Ralph H. Potter, Jr., Maj., USA
Thomas L. Robbins, Maj., USA
John E. Roberts, Maj., USA
Samuel Rodriguez, Maj., USA
Edmond Scavone, Maj., USA
Jacob F. Schirmer, Maj., USA
Norman McL. Scott, Jr., Maj., USA
Leonard H. Seitzman, Maj., USA
Frank J. Shannon, Jr., Maj., USA
John K. Spitznagel, Maj., USA
Murray Spotnitz, Capt., USA
Edwin S. Stenberg, Jr., Maj., USA
Donald J. Strand, Maj., USA
Billie G. Streete, Maj., USAF
Herbert P. Sube, Maj., USA
Richard R. Taylor, Maj., USA
Harry J. Umlauf, Jr., Maj., USA
Keith A. Walker, Maj., USA
Gordon T. Wannamaker, Maj., USA
Willard R. Warren, Maj., USA
Thomas J. Whelan, Jr., Maj., USA
Paul G. Yessler, Maj., USA
Douglas A. Zimmerman, Maj., USA

Dental Corps

Charles C. Alling, Maj., USA
Robert B. Arbuckle, Maj., USA
Hector Bethart, Maj., USA
Leo F Baranowski, Maj., USA
Robert E. Bates, Maj., USA
John R. Chandler, Jr., Maj., USA
Robert R. Clark, Maj., USA
Linus M. Edwards, Jr., Maj., USA
Reginald J. Fallis, Lt. Col., USA
Wilfred H. Gladue, Maj., USA
Arthur B. Harris, Maj., USAF
August R. Huberwald, Lt. Col., USAF
Leonard S. Johnston, Maj., USAF
Marvin M. Kuhn, Maj., USA
Lloyd Lister, Maj., USA
Peter M. Margetis, Maj., USA
Howard W. McCall, Maj., USA
Ashton A. Moody, Maj., USA
Richard A. Moll, Maj., USA
Theodore J. Post, Col., USA
William M. Ream, Lt. Col., USA
Jack Roper, Maj., USA
Hosea F. Sawyer, Maj., USA
Francis W. Shaffer, Maj., USA
Ralph B. Snead, Maj., USA
Kenneth L. Stewart, Capt., USAF
William C. Strong, Maj. USA
Thomas W. Taylor, Maj., USA
Henry C. Thompson, Maj., USA
James T. Thompson, Maj., USA
George I. Uohara, Capt., USA
Ross W. Warren, Capt., USA
George I. Wian, Jr., Maj., USA
Justin S. Zack, Maj., USA

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William S. Gochenour, Jr., Maj., USA
Don L. Mace, Lt. Col., USA
Stewart J. McConnell, Capt., USA
Thomas G. Murnane, Jr., Capt., USA
Lloyd J. Neurauter, Maj., USAF
James M. Shuler, Capt., USAF
James B. Young, Capt., USA

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Eugene M. Baker, Capt., USA
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Leonard C. Barney, Maj., USA
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Roger R. Besson, Capt., USA
Wilbert A. Black, Capt., USAF
Lyman Blakesley, Capt., USA
Jack T. Blue, Capt., USA
William V. Breyfogle, Maj., USA
Arthur E. Britt, Maj., USA
Byron W. Brown, Maj., USA
John A. Brown, Maj., USA
Roy A. Bryan, Maj., USA
Dee C. Buchanan, Maj., USA
Phillip J. Buckler, Maj., USA
Jesse N. Butler, Maj., USA
Robert M. Bynum, Capt., USA
Thomas P. Caito, Maj., USA
Ernest D. Chadbourne, Capt., USA
William J. Clegg, Jr., Maj., USA
Milton Cohen, Capt., USA
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George F. Conrad, Maj., USA
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Stanley W. Egense, Jr., Maj., USA
Earl D. Ess, Capt., USA
Findlay F. Flatter, Maj., USA
James R. Francis, Maj., USA
William K. Fugitt, Maj., USA
Howard J. Funston, Maj., USA
Sidney Gaines, Maj., USA
Harry L. Gans, Maj., USA
Walter H. Gelby, Maj., USA
Wilmot L. Gibson, Maj., USA
Harold S. Gillespie, Capt., USA
Matthew Ginalick, Capt., USA
Frank D. Godwin, Maj., USA

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Richard S. Greer, Maj., USA
James D. Grindell, Maj., USA
George L. Grow, Maj., USA
John M. Hallahan, Maj., USA
Bernard W. Hammaker, Maj., USA
Alan Harcus, Capt., USA
Cecil H. Hayes, Capt., USA
William H. Hayes, Capt., USA
Harold E. Hill, Maj., USA
Harold C. Hodgkins, Capt., USAF
John W. Holt, Maj., USA
Claude L. Hooker, Maj., USA
Kenneth G. Howard, Maj., USA
Melville C. Hutchinson, Maj., USA
Maurice W. Hylden, Maj., USA
Dean M. Jewell, Maj., USA
Wayne H. Jonson, Maj., USA
Daniel R. Kifner, Maj., USA
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Carl J. Koehn, Lt. Col., USA
Matthew J. Kowalsky, Maj., USA
William O. Krause, Maj., USA
Lester M. Kyke, 1st Lt., USA
Philip L. La Manche, Maj., USA
Harold P. Larson, Maj., USA
Howard C. Leifheit, Capt., USA
Claude R. Lenn, Maj., USA
William H. Lindsey, Capt., USA
Vernon H. Loisel, Maj., USA
Henry E. Lord, Capt., USA
Francis T. Lynch, Maj., USA
Dale R. Maher, Maj., USA
Edward Marks, Maj., USA
Edward J. Martin, Maj., USA
Marshall A. Mason, Jr., Capt., USA
Charles F. McAdeer, Jr., Capt., USA
James E. McArthur, Capt., USA
Gordon F. McCleary, Lt. Col., USA
Norman G. Miller, 1st Lt., USA
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James E. Moore, Capt. USA
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Arthur W. Park, Capt., USAF
Charles E. Patch, Jr., Capt., USA
Albert L. Paul, Capt., USA
Michael J. Pavlo, Capt., USA
William G. Pearson, 1st Lt., USA
Theodore S. Pendrak, Capt., USA
Marion J. Pitt, Maj., USA
Sam A. Plemmons, Maj., USA
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Dudley F. Powell, Maj., USAF
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Winston K. Powell, Capt., USA
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Robert A. Stone, Capt., USA
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Hughie C. Thomas, Maj., USA
Jerry V. Thompson, Maj., USA
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Elon B. Tucker, Lt. Col., USA
Floyd E. Van Sickle, Jr., Maj., USA
Foster Watts, Maj., USA
William M. Wegner, Capt., USA
Earl Weiss, Capt., USAF
Lyle H. Wharton, Capt., USA
Charles L. Wittlif, Capt., USA
Charles R. Wolf, Jr., Maj., USA
Bertram S. Wright, Maj., USA
Warren W. Zielonka, 1st Lt., USA
Joseph C. Ziesenheim, Capt., USA

Nurse Corps

Helen M. Abramoska, Lt. Col., USA
Carrie E. Barrett, Lt. Col., USA
Mary C. Bateman, Lt. Col., USA
Olga M. Beamon, Capt., USA
Helen L. Black, Capt., USA
Beverly E. Bochman, Capt., USA
Mayme V. Campbell, Capt., USA
June L. Chambers, Capt., USA

Nurse Corps—Continued

Anastasia A. Chaponis, Capt., USA
Laverne M. Collaro, 1st Lt., USAF
Jeanette M. Confort, Capt., USA
Mabel H. Corbin, Capt., USA
Geraldine V. Coxwell, Capt., USA
Jean M. Dodds, Capt., USA
Mary L. Donovan, Capt., USA
Maxine Douglas, Capt., USA
Mildred Duncan, Capt., USA
Lillian Dunlap, Capt., USA
Winifred L. Edman, Capt., USA
Berniece I. Fairaizl, Capt., USA
Vivian Farland, 1st Lt., USA
Catherine E. Fuller, 1st Lt., USA
Emma A. Galgano, Capt., USA
Eleanor R. Gallagher, Capt., USA
Eleanor A. Gaynor, Capt., USA
Betty M. Gieldseth, 1st Lt., USA
Shirley M. Gilson, Capt., USA
Miriam K. Ginsberg, 1st Lt., USA
Margaret M. Griffith, Capt., USA
Ida L. Haegele, Capt., USA
Julia E. Hambrick, Capt., USA
Aloha B. M. Hammerly, Capt., USA
Helen M. Hill, Capt., USA
Louise Hill, 1st Lt., USA
Mary I. Hogan, Maj., USA
Lucy E. Jacobson, Lt. Col., USA
Mary A. Jones, Capt., USA
Lois King, Capt., USA
Grace E. Know, Capt., USA
Ruth L. Koontz, Capt., USA
Lena S. Kropski, Capt., USA
Ethel A. Lamansky, Lt. Col., USA
Frances I. Lay, Lt. Col., USAF
Lillian G. Link, Capt., USA
Betty L. Madden, Capt., USA
Mary E. Mahar, Capt., USA
Petrina M. Mead, Capt., USA
Esther M. Momrow, 1st Lt., USAF
Helen E. Moode, Capt., USA
Daisy E. Moore, Capt., USA
Marie L. Morris, Capt., USA
Louise L. Mortensen, Capt., USA
Nora E. Murphy, Capt., USA
Gladys O. Neirby, Capt., USA
Barbara J. Nichols, Capt., USA
Florence L. Pettey, Capt., USA
Irene R. Z. Pishak, Capt., USA
Joan M. Polidora, 1st Lt., USA
Ida G. Price, Maj., USA
Kathleen E. Quigley, Capt., USA
Rosa J. Ramirez, Capt., USA
Mildred F. Schooley, 1st Lt., USAF
Minerva A. Senn, Capt., USA
Margaret M. Shea, Capt., USA
Marion L. Smith, Capt., USA
Elizabeth J. Starkey, 1st Lt., USA

DEATHS

COREY, Giles Patterson, Lieutenant (MC) USNR, New Bern, N. C.; U. S. S. *Antietam;* graduated in 1951 from the Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, N. C.; appointed a Lieutenant (jg) 31 August 1953; ordered to active duty 30 October 1953; died 23 October 1955, age 30, at the Duke Hospital, Durham, N. C., of multiple myeloma.

HARRIS, Louis Marshall, Captain (MC) USN, Newport, R. I.; U. S. Naval Hospital, Newport; graduated in 1931 from the University of Arkansas School of Medicine, Little Rock, Ark.; commissioned a Lieutenant (jg) in 1931; died 11 November 1955, age 54, at the Newport Naval Hospital, of coronary occlusion.

OWNBY, Thomas "J," Commander (DC) USN, Brooklyn, N. Y.; U. S. S. *Wisconsin,* graduated in 1931 from the Kansas City-Western Dental College, Kansas City, Mo.; appointed a Lieutenant (jg) in the United States Naval Reserve 30 April 1942; ordered to active duty 4 August 1942; released to inactive duty in November 1945; commissioned a Lieutenant Commander in the Regular Navy in October 1948; died 18 October 1955, age 47, at his home in Brooklyn, N. Y., of coronary thrombosis.

VARELIA, Helen Louise, Ensign (MSC) USNR, Los Angeles, Calif.; U. S. Naval Hospital, San Diego, Calif.; graduated in 1951 from the Fresno State College; appointed an Ensign and ordered to active duty 11 January 1955; died 3 November 1955, age 26, at the San Diego Naval Hospital, of a subarachnoid hemorrhage.

Reviews of Recent Books

PSYCHIATRY FOR THE FAMILY PHYSICIAN, by *C. Knight Aldrich*, M. D. 276 pages; illustrated. The Blakiston Div., McGraw-Hill Book Co., Inc., New York, N. Y., 1955. Price $5.75.

This is a real gem and by far the most worthwhile of the many volumes available which explain psychiatry and its principles to the nonspecialist. The scope of the book is comprehensive, its style admirably lucid, and the absence of the usual psychiatric jargon is most commendable. The author never commits the fault of being condescending or patronizing to the family physician, but instead presents his subject in the most understandable and logical manner, ending each chapter with a brief summary.

By far the best chapter is the one dealing with treatment, in which is described actual treatment methods that the family physician can use. Essentially these are brief psychotherapeutic methods, using the technics of psychologic support which the author reasonably feels is applicable to a series of treatment periods averaging only 20 minutes each.

This admirable volume is highly recommended not only for "family physicians" but for medical students as well. It is a true teaching text, and even psychiatric residents beginning training would benefit from reading it, if only to see how logically and simply the subject can be presented.— *JOHN F. MC MULLIN, Capt. (MC) USN*

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 63, Art. 1, Pages 1-144, July 15, 1955, edited by *Roy Waldo Miner*. "The Regulation of Hunger and Appetite." Conference Chairman and Consulting Editor: *Franklin Hollander*. 143 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1955. Price $3.

In November 1954 a conference on the regulation of hunger and appetite was held at the New York Academy of Sciences. Thirteen papers dealing with regulating mechanisms and clinical aspects were presented. These articles constitute one of the best sources of our scientific knowledge of hunger and obesity to be found anywhere. Free from the emotional bonds that grip many papers on the subject, reports of experiments and clinical observations are presented by several of the most active investigators in the field.

Some especially stimulating reports deal with a "night-eating syndrome," with special food cravings and aversions, and with a "lipostatic" hypothesis. The theme, however, is the physiologic, biochemical, and pharmacologic aspects of hunger and appetite and, therefore, is of particular interest to both clinicians and research workers. This book can be highly recommended.—*S. O. WAIFE, Lt. Comdr. (MC) USNR*

ADVANCES IN INTERNAL MEDICINE, Volume VII, edited by *William Dock*, M. D. and *I. Snapper*, M. D. 311 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1955. Price $8.50.

This volume contains eight articles of current interest. The subjects covered are renal lithiasis, hepatic coma, pathophysiology of the pancreas, serum mucoproteins, physiology of clinical disorders of the adrenal gland, diseases of the pericardium, nephrotic syndrome, and applied physiology.

The physician can keep well informed of current advances in these reviews. Each subject has an extensive bibliography, and the subject and author indexes are excellent. For the physician desiring the latest information and bibliography on any of the above subjects, the book is recommended.

The reviews are of little practical value in regard to an understanding of their application to clinical medicine and are not intended for the general practitioner. The undergraduate student or the physician desiring the latest information on these subjects will find this book very valuable. The extensive bibliography for references alone justifies the inclusion of the book in the library of the internist.

—*WALTON M. EDWARDS, Lt. Col., MC, USA*

NEW AND NONOFFICIAL REMEDIES, 1955. The Council on Pharmacy and Chemistry, American Medical Association. 653 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa.. 1955. Price $3.35.

The Council on Pharmacy and Chemistry of the American Medical Association has, as one of its primary goals, the encouragement of the rational practice of therapeutics. To aid in the attainment of this goal the Council annually publishes statements of drug actions and monographs on newer drugs in *New and Nonofficial Remedies*, and this book fills a need not met by the official drug control bodies.

The drug action portion of the N. N. R. for 1955 is excellently written. In contrast, the monographed articles seem to be neither *new* nor *nonofficial*. As an example, of the 15 articles accepted under the heading "Agents Used in Allergy," 11 have been included in the United States Pharmacopeia and one in the National Formulary. Under the section dealing with sympathomimetic substances are found 12 official substances and only 8 nonofficial ones.

There seem to be several noteworthy omissions of articles which are *new* and *nonofficial* from this edition. Under "Motion Sickness Remedies" N. N. R. lists one agent—dimenhydrinate USP—while a current review article on the subject cites equal or superior effectiveness for at least two other compounds. Under "Antidotes for Heavy Metal Poisoning," the 1955 N. N. R. includes only dimercaprol USP; and omits mention of the chelating agents which are admittedly effective in heavy metal poisoning. These omissions seem to point to the need for more emphasis on evaluation of new remedies by the Council.

In spite of omission of some really *new* drugs and a tendency to retain products which have become official and well known, this publication remains a reliable source book from which the medical profession may obtain a conservative, accurate statement of modern concepts of drug action, along with monographs on fairly new drugs.

—*ROY L. MUNDY, Capt., MSC, USA*

THE PREVENTION OF DISEASE IN EVERYDAY PRACTICE, by *Isadore Givner,* M. D., F. A. C. S. and *Maurice Bruger,* M. Sc., M. D., C. M., F. A. C. P. 964 pages; illustrated. The C. V. Mosby Co., St. Louis, Mo., 1955. Price $20.

Most diseases, particularly those of an infectious nature, with the discovery of their cause, have been brought under public health control. Many other diseases, however, such as diabetes, arthritis, cardiovascular and mental disorders, and carcinoma, still are blocking progress in preventive medicine. Any further progress in such conditions will depend more and more on the practicing physician who must be concerned not only with the prevention of these diseases but also with the prevention of their complications and the complications that might arise from operative procedures which patients with these diseases frequently require.

This volume is concerned with the present-day trend on the preventive aspects of such diseases and their complications that are observed in the everyday practice of medicine. It is written by more than 40 contributing practicing physicians, each one a specialist in a recognized field of medicine, including dentistry.

Suitable references are given at the end of each of the 37 chapters. The index, printing, and binding are excellent.

Today, with the line of distinction between preventive medicine and medical practice being erased, this book will serve a useful purpose to every practicing physician.—*PATRICK I. McSHANE, Col., MC, USA*

THE HUMAN MACHINE, Biological Science for the Armed Services, by *Charles W. Shilling,* Captain (MC) USN. 292 pages; illustrated. United States Naval Institute, Annapolis, Md., 1955. Price $5.

The military commander who understands the physical, emotional, and intellectual complexities of his men is a rarity. Knowing full well the limited knowledge of the human organism possessed by the majority of officers holding or aspiring to positions of command, the author has provided a valuable and timely volume for their education and guidance. It is equally applicable in civilian life where "the human machine" is the key to successful progress in industry, science, and the arts.

The three parts of this readable book contain a total of 20 chapters on the human machine's construction and operation (anatomy and physiology), preventive maintenance and repair, and use in war. The style is pleasing and the context is geared to the experiences and understanding of the lay reader. Although influenced by Dr. Shilling's long

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career in the Navy, full consideration is given to all aspects of the stresses of military life. Specialized sections on oral health, first aid, marine biology, and aviation medicine have been prepared by his colleagues, particularly those at the United States Naval Academy. In conclusion, the author stoutly defends the staff medical officer: "The commanding officer is not only a more efficient, but a bigger and better naval officer if he listens to professional advice in the areas in which he obviously cannot be competent."

This book is attractively illustrated and handsomely published. It has an adequate index and a bibliography of appropriate references. The foreword is by Vice-Admiral C. Turner Joy, USN.

—*ROBERT J. BENFORD, Col., USAF (MC)*

SURGICAL PHYSIOLOGY OF THE ADRENAL CORTEX, by *James D. Hardy*, M. S. (Chem.), M. D., F. A. C. S. 191 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $5.75.

This monograph considers the physiology, experimental data, and management as well as indications for use of ACTH and cortisone in various disease states. Two chapters are particularly valuable for the practical surgeon who is seeking ready information. While of interest, the remaining chapters are not so essential, as most of the information is repeated briefly in the last chapter. The format is somewhat cumbersome and occasionally distracting in that references are individually mentioned by name throughout the text, thus breaking the chain of thought. The frequent repetition of 274 references is an enormous obstacle in such a short monograph. However, this does provide a ready bibliography for adrencortical study.

The monograph offers an encompassing review of the adrenal cortex and would be of value to house officers in surgery who are looking for efficient, practical information on this subject.

—*VICTOR C. STRATTON, Comdr. (MC) USN*

CARDIOLOGY NOTEBOOK For Preliminary Instruction in Medical Curricula. Columbia University College of Physicians and Surgeons. 97 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1955. Price $2.50.

This unique book consists mostly of illustrations with a minimal amount of words. It is designed for medical students in their first years of clinical medicine and brings together in one small volume excellent illustrations of normal and common abnormal cardiac roentgenograms, electrocardiograms, and phonocardiograms. The posteroanterior, the left anterior oblique, and the right anterior oblique fluoroscopic views of the normal heart are illustrated. Abnormal cardiac conditions best observed in these various positions are described and shown.

Normal values of pulmonary function and cardiac hemodynamics are given, as well as the nomenclature for making a complete cardiac diagnosis including functional capacity and therapeutic classification.

All in all, this is a worthwhile book for the medical student. Interns and residents will also find it useful and worth the price. An added feature is that on almost every other page there is space for making additional notes.

The authors are to be commended for including so much material so completely in such a simplified way that it can be reviewed in an hour or so, depending on the desire of the reader.

—*PATRICK I. McSHANE, Col., MC, USA*

IONOGRAPHY, Electrophoresis in Stabilized Media, by *Hugh J. McDonald*, D. Sc. In collaboration with *Robert J. Lappe*, M. S., *Edward P. Marbach*, Ph. D., *Robert H. Spitzer*, M. S., and *Matthew C. Urbin*, Ph. D. 268 pages; illustrated. Year Book Publishers, Inc., Chicago, Ill., 1955. Price $6.50.

The field discussed in this volume is one in which the current rate of expansion far exceeds the amount of information readily available to a person who wishes to employ the technics involved. The author and his collaborators have produced a text that can be readily used by beginners in the field. They describe in some detail the various types of apparatus for this method of chromatography, and discuss the methods used in all phases of ionography. The importance of mobility determinations is stressed and the methods to carry out this part of the analysis are given in extra detail. The relation between mobilities in stabilized and nonstabilized media is clearly defined and developed.

Half of the book concerns the applications of this method to biochemistry. Passing reference is given to other applications. These chapters form a good review and beginning point for the investigator who would like to use these technics. The references are more than adequate and cover the field well.—*IRVING GRAY, Lt. Col., MSC, USA*

AN OUTLINE OF PRESENT DAY THORACIC SURGERY, by *Robert I. Carlson*, M. D. 158 pages. Educational Publishers, Inc., St. Louis, Mo., 1954. Price $4.25.

In a 158-page brochure the author has prepared an outline of thoracic surgery primarily for medical students, interns, and residents. Its purpose is to serve as a starting point for those interested in thoracic surgery. The discussion given in outline form of necessity is brief but well presented. Several notations are made to different concepts in therapy which afford the reader a ready index for further study. The chapter on cardiac surgery is not as complete as the others that deal with the remainder of thoracic surgical topics.

The pages of the outline are bound by plastic rings which hinder the turning of the pages and frequent use will no doubt loosen many of the pages. There are no illustrations, graphs, or diagrams. The index is well organized, and the bibliography contains many references.

—*JOSEPH M. HANNER, Capt. (MC) USN*

LABORATORY IDENTIFICATION OF PATHOGENIC FUNGI SIMPLIFIED, by *Elizabeth L. Hazen*, Ph. D., and *Frank Curtis Reed*. 108 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $5.50.

Considering the brevity of this monograph (108 pages, 100 photographs), much useful information is presented. The essential features of the most common dermatophytes and systemic fungi encountered in North America are presented in tabular form. The photomicrographs of the diagnostic structures and tissue phases are typical and clearly correlated to textual descriptions. The fungus diseases are discussed briefly from a clinical point of view and reference is made very briefly to the use of laboratory animals and to the specimens ordinarily submitted for examination. In the last few pages, there is appended an excellent group of selected references and a compilation of formulas of the most commonly used media with, however, no guide as to their intended use.

The somewhat fragmentary information presented regarding procedures and technics, variation and growth characteristics of the pathogens, and the use of black and white photographs (in the case of the giant colonies) limits the utility of this manual to the trained worker. In order to use this monograph in a practical manner, the beginner must possess a knowledge of the relative distribution, growth characteristics, variation, and morphology of the common saprophytic forms (about which no reference has been made herein) and some knowledge of the necessary precautions and methods of collecting and treating specimens, as well as a knowledge of technics and procedures unique to mycology.

In spite of the above limitations, a definite contribution has been made in a rather complex field. To the bacteriologist, dismayed by the present state of mycologic diagnosis and possessing the requisite knowledge set forth above, the task of identifying pathogenic fungi should become less arduous and confusing with the aid of this monograph. It will also serve admirably as an aid in teaching the elements of mycologic diagnosis to beginners when used in conjunction with the display of actual giant colonies and presentation of adequate technical descriptions.—*GRANVILLE M. MOORE, Lt. Comdr. (MSC) USNR.*

CLINICAL TOXICOLOGY, by *Clinton H. Thienes*, M. D., Ph. D., and *Thomas J. Haley*, Ph. D. 3d edition. 457 pages; illustrated. Lea & Febiger, Philadelphia, Pa., 1955. Price $6.50.

The format and style of this third edition of a well-known textbook remain the same as in previous editions, but there is a moderate expansion to incorporate information on recently introduced chemicals such as the anticholinesterase insecticides and defoliative compounds. Newer improved methods of analysis for the qualitative and quantitative presence of various chemicals have been substituted, and methods for the protection of additional substances such as the synthetic estrogens and antithyroid compounds have been added.

In a brief but adequate manner the chemistry, pharmacology, pathology, symptomatology, and treatment of patients with poisoning due to common substances are discussed. Poisons are grouped according to their major mechanism of action. Where they act strongly on more than one physiologic system, they are mentioned under various appropriate headings. Closely related poisons are discussed, however, under a single heading. For the general practitioner, Chapter 29, "An Outline of Symptom Diagnosis," is of value in the differential diagnosis of various types of poisoning. The last third of the book is devoted to analytic methods for the qualitative and quantitative detection of the various poisons. The original references for most of these methods are stated, but the symptoms and treatment are covered without any bibliography other than a mention in the preface of other books of toxicology. A moderate number of pertinent illustrations accompany the methods for chemical analysis.

This book contains a large amount of information on toxicology condensed into a relatively small and useful manual. It is highly recommended as a text in a classroom or as a guide to the clinician.

—MILWARD W. BAYLISS, Col., MC, USA

MANAGEMENT OF DISORDERS OF THE AUTONOMIC NERVOUS SYSTEM, by *Louis T. Palumbo,* M. D. 186 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1955. Price $5.

In the space of less than 150 pages of text the author has attempted to cover the broad field relating to the autonomic nervous system. When one appreciates the vast anatomic, physiologic, and clinical implications of the autonomic nerves, controlling to a large extent the vitally important function of homeostasis as they do, it is at once evident this publication can but briefly touch upon the various facets of the subject.

The pattern of the book essentially follows that of other well-known works on the subject. In none of these three chapters devoted to anatomy, physiology, and pharmacology is there any new material. In the chapters covering the application of the several forms of therapy for disorders of the autonomic nervous system one gets the impression of overenthusiasm for anticipated results. There is no description of surgical technics; however, reference is made to failures to attain anticipated results because of incomplete ablation. The 172 references cover a liberal range of relatively recent literature relating to the autonomic nervous system, and the index is entirely adequate.

This volume is one of the general practice manuals and as such may perhaps serve a usual purpose, though one should not be misled into expecting miracles from the use of many of the medical or surgical procedures recommended. It is definitely not a work of reference for the specialist and does not represent any original investigation.

—EVERETT H. DICKINSON, Capt. (MC) USN

EXPERIENCING THE PATIENT'S DAY, A Manual for Psychiatric Hospital Personnel, by *Robert W. Hyde*, M. D. 214 pages. G. P. Putnam's Sons, New York, N. Y., 1955. Price $2.20.

This book, written with the collaboration of the attendants of the Boston Psychopathic Hospital, is exactly what its subtitle says. It is the outcome of a series of group discussions that the author had on a continuing basis with his attendants, to increase their potential skills in working with patients. "The education of the attendant is primarily the process of observant participation with patients, where together they may understand the essential elements of human experience."

Various sections are entitled "The 24 Hour Day," "Examination of the Patient," "Treatment," "Symptoms and Diagnosis," "Orientation," "Problems," and "Ward Problems." Each section has an introductory note describing the subject, and then reports the interchange of thoughts and feelings of the attendants, who actually spend most time with the patients. The varying attitudes toward particular problems, toward patient behavior, et cetera, and the way they impinge on the therapeutic program, are clearly delineated.

A similar program on a much smaller scale has been instituted—with encouraging results—on the several services where this reviewer has been chief. It is therefore recommended that copies of this excellent manual be available at all military installations where neuropsychiatric staff personnel are in training.

It is regretted that the binding is of paper, because this book will be much in use. —*FELIX H. OCKO, Capt. (MC) USN*

SADDLE BLOCK ANESTHESIA, by *Ray T. Parmley*, M. D. 59 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $2.50.

Although the material presented in this short monograph is highly technical, it is written in a clear, logical style. The presentation should appeal to both the general practitioner and the obstetrician, who are called upon to perform spinal analgesia, and should be instructive to residents in anesthesia.

The anesthesiologist will find nothing new in this monograph. However, the general principles of spinal analgesia are so clearly described that even the specialist can profit from such a well-organized review. There is no doubt that the author has a wide experience with the spinal technic. The rules he sets down for successful spinal analgesia can come only from a great deal of personal experience. The unpopularity of spinal analgesia in some localities is discussed. The fear of this technic apparently lies in the medicolegal implications. There is one small complaint. The references to the figures are confusing.

—*DANIEL M. PINO, Comdr. (MC) USN*

SYSTEMIC LUPUS ERYTHEMATOSUS: Review of the Literature and Clinical Analysis of 138 Cases, by *A. McGehee Harvey*, M. D., *Lawrence E. Shulman*, M. D., *Philip A. Tumulty*, M. D., *C. Lockard Conley*, M. D., and *Edyth H. Schoenrich*, M. D. 437 pages; illustrated. The Williams & Wilkins Co., Baltimore, Md., 1955. Price $3.

This book is a reprint of an article that appeared in the December 1954 issue of *Medicine*, and consitutes an excellent review of the clinical aspects of systemic lupus erythematosus. It is an analysis of 138 cases from the Department of Medicine of the Johns Hopkins University and Hospital and a review of the literature on this topic. The protean manifestations of the disease are stressed. The L. E. cell phenomenon is adequately discussed as well as the chronic biologic false positive serologic tests for syphilis. Of great value to the internists and rheumatologists are the 29 pages devoted to hormone therapy, outlining the specific effects of such therapy on the specific manifestations of the disease. One of the most valuable features of the book are the illustrative patients that have been carefully selected to show the protracted course of the disease, the varied symptomatology, the diagnostic problems they initially present, and the effects of hormonal therapy on the various systemic manifestations.

This book is the most complete treatise in print today on systemic lupus erythematosus. An excellent bibliography is appended, the illustrations are excellent, and the many tables and diagrams are clearly and concisely presented.

Those interested in connective tissue disease will find the book a valuable addition to their library and one they will constantly use.

—*LEON J. NUMAINVILLE, Col., MC, USA*

J. A. M. A. Clinical Abstracts of Diagnosis and Treatment. Published with the Approval of the Board of Trustees, American Medical Association. 627 pages. Intercontinental Medical Book Corp., with Grune & Stratton, Inc., New York, N. Y., 1955. Price $5.50.

This is the first of an annual series of clinical abstracts culled from 1,200 periodicals, selected by Nash D. Fabricant, M. D., Editorial Associate, Journal of the American Medical Association.

The abstracts have been grouped under 14 headings: Internal Medicine, Surgery, Neurology and Psychiatry, Pediatrics, Gynecology and Obstetrics, Dermatology, Urology, Ophthalmology, Otolaryngology, Therapeutics, Pathology, Radiology, Anesthesia, and Physiology. The index is unique in that each of the above-named sections is alphabetized individually rather than collectively.

The grouping of these abstracts, while of limited value in diagnosis and treatment, permits a quick determination as to the desirability of studying the original articles. Likewise, the physician preparing a paper for presentation to a medical society or journal has a ready reference, easily located, due to the grouping of the various subjects.

—*ARTHUR E. WHITE, Col., MC, USA*

PROGRESS IN NEUROLOGY AND PSYCHIATRY, An Annual Review, Volume X. Edited by *E. A. Spiegel*, M. D., 645 pages. Grune & Stratton, Inc., New York, N. Y., 1955. Price $10.

The purpose of this series as stated in the preface to this 10th annual volume is ". . . they bring the reader up to date regarding recent developments in the fields of neurology and psychiatry, (and) their basic foundations and clinical ramifications . . . ." It is believed this purpose has been achieved in noteworthy fashion.

The current volume makes its usual significant contribution to our integrated knowledge of psychiatry and neurology. It is essentially a synthesizing effort in which the essential elements of the many papers reviewed are presented appropriately in relationship to each other and in relationship to the logical subdivisions of the already known.

The table of contents is logically and usefully devised; references are complete; and the volume is well indexed. The presentation is in narrative form, readable, and particularly valuable because of its intrinsic integrating and synthesizing qualities.

This, as are the previous nine volumes, is a record of history in the making, and should be read by all in the field who wish to keep their knowledge current.— *DONALD B. PETERSON, Col., MC, USA*

BRITISH MEDICAL BULLETIN, Blood Coagulation and Thrombosis, Volume XI, Number 1. 82 pages; illustrated. Published by Medical Department, The British Council, London, April 1955. Distributed by Oxford University Press, New York, N. Y., Price $2.75.

This book is the latest in this important series of reviews. After the heavy dose of clotting-in-the-test tube which the medical world has endured these 20 years, a trend toward a wider view of hemostatic disease is long overdue and more than welcome. The coagulationists have done well in these years, uncovering a dozen clotting factors and two new hemorrhagic diseases for each factor. We have grown to think of hemostasis and coagulation as equivalents with the flaws of one inevitably reflected in the other. Through publications such as this one a better perspective is coming to focus. We are learning to appreciate that faults of the hemostatic mechanism may be insignificant, they may cause bleeding, they may permit bleeding (with injury), or they may cause thromboembolism. Of these diseases, bleeding is the most flamboyant and, perhaps, that is why it has received most attention. But thromboembolism kills more people than any other single disorder. We are doing well nowadays to single it out for attention.

The issue of this journal at hand is the best contemporary statement of our clinical and investigative positions with relation to hemostatic disease, both hemorrhagic and thrombotic.

—*WILLIAM H. CROSBY, Lt. Col., MC, USA*

1955 MEDICAL PROGRESS. A Review of Medical Advances During 1954, edited by *Morris Fishbein*, M. D. 346 pages. The Blakiston Div., McGraw-Hill Book Co., Inc., New York, N. Y., 1955. Price $5.

This book undertakes to present a review of the new advances in the various specialties of medicine occurring since the 1954 edition. This purpose is adequately accomplished by 28 contributors, including many men of importance in American medicine. The majority of these contributors represent three centers of medical education: Chicago, Boston, and Rochester, Minn.

The book will find its greatest usefulness in the hands of the general practitioner of medicine, to whom it offers a moderately comprehensive report of current thought in a single edition. For this reason the book has some value for the military physician practicing in any area except a major military medical center.

Inherent in such a presentation is the difficulty in achieving a proper balance in presenting evidence of progress in the various specialties. The chapter entitled "New Drugs" merits 5 pages. "Cardiovascular Diseases" receives a scant 7 pages, including 2 pages of bibliography, while "Endocrinology" spans a full 36 pages of textual material and 4 pages of bibliography. Many cardiologists would disagree with the author's opinion that "during 1954 nothing spectacular was added to the armamentarium of the physician dealing with cardiovascular diseases."

—DAVID B. CARMICHAEL, Lt. Comdr. (MC) USN

DOCTOR AND PATIENT, by *Desmond O'Neill*, M. D., M. R. C. P. (Lond.), D. P. M. (Eng.). 197 pages. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $5.

This book was originally published in England under the title, "A Psychosomatic Approach to Medicine," which I believe to be a better title than that of this edition. Reflecting the author's extensive experience as a specialist in psychiatry, the book will be of most value to the general practitioner, but will also be interesting and helpful to the various specialists. Psychiatrists will enjoy it; their foundation in psychosomatic medicine will be strengthened, and they will benefit especially from the chapter devoted to recent experiments which throw light on physiologic responses to stress. A short chapter discusses the origin, decline, and resurgence of the concept of the whole—the total personality—the conviction that the proper object of the physician's study is the patient and not the disease. One chapter discusses, and quotes figures of, a carefully planned survey of the prevalence of stress disorders which are observed by the general practitioner and specialists. The greater portion of the book is devoted to a discussion of 22 of the more common, major symptom-complexes commonly found in stress disorders. Numerous short case reports are given as illustrations, failures as well as successes are cited, and the probable causes of failure are discussed.

The various therapies of the stress disorders are described for the general practitioner, and for specialists other than psychiatrists. A bibliography consisting of an adequate number of the best references will satisfy the vast majority of readers and is appropriate to this presentation. This small, inviting, unusually readable book is recommended for every physician.— *EATON W. BENNETT, Col., MC, USA*

INTESTINAL OBSTRUCTIONS, Physiological, Pathological, and Clinical Considerations with Emphasis on Therapy, Including Description of Operative Procedures, by *Owen H. Wangensteen,* M. D., Ph. D. 3d edition. 838 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $15.50.

The first new edition of this book in 15 years reflects the many years of study and experimentation in the physiology laboratory and analysis of the subject by Dr. Wangensteen and his colleagues at the University of Minnesota. The book is well written in an informal style and is printed in most legible type on excellent paper. Illustrations are in black and white and are good. The bibliography is exhaustive.

The first part of the book presents the pathologic physiology of distention, diagnostic considerations, fluid replacement therapy, intestinal intubation as a therapeutic measure, the factors leading to the decision to operate, the selection of the proper operative procedure in the individual patient, and postoperative care and mortality. The remainder of the book concerns itself with specific causes of obstruction, from the common adynamic ileus to the rare internal hernia.

Dr. Wangensteen observes good teaching practice—constant repetition of the points he considers of most importance. He is a stalwart champion of the aseptic closed type of intestinal anastomosis and believes strongly that an open type of anastomosis protected by intestinal antibiotics is an inferior procedure. His belief in this matter is not shared by a majority of surgeons, but there is no denying that, statistically, his method is good. The one-layer anastomosis is also strongly championed. There undeniably is much to recommend it.

The section devoted to the passage into the small bowel of the Grafton Smith tube with maneuverable stylet control under fluoroscopic visualization is most interesting, as is the discussion of the use of enterostomy in intestinal obstruction.

There is no doubt that this book is no compiling of ideas from the works of other people but, rather, represents the opinions of a skilled and able surgeon and teacher based on many years of his own and his staff's experience in clinic and laboratory. Any surgeon receiving paients from outlying regions knows with what consistency intestinal obstruction can be mishandled. This book is highly recommended for the library of all physicians who may be expected to handle the life-or-death problem of intestinal obstruction.

—*DAVID E. THOMAS, Lt. Col., MC, USA*

CARDIAC AUSCULTATION, Including Audio-Visual Principles, by *J. Scott Butterworth*, M. D., *Maurice R. Chassin*, M. D., and *Robert McGrath*, M. D. 111 pages; 54 illustrations. Grune & Stratton., Inc., New York, N. Y., 1955. Price $4.50.

This is a book devoted entirely to auscultation of the heart. The authors take up the history of auscultation, the equipment used in their particular study, and the physics of sound as it pertains to heart murmurs. They then discuss the clinical aspects of heart sounds and murmurs, going into some detail regarding different kinds of sounds, the evaluation of timing, duration, pitch, intensity, and the other factors which help in the interpretation of sounds and murmurs.

This study apparently represents a considerable amount of work over some period of time. The illustrations of heart sound tracings are unusually clear and the technic of recording must have been exceptional.

There are two major criticisms of this work. The first, which may be a personal prejudice of the reviewer, is that studies of this type should not be published expensively in hard covers. The second criticism, which again may be a personal idiosyncrasy, is that this is not the best way to teach physical diagnosis. The study of gross structural cardiac defects requires the liberal use of observation, palpation, and percussion as well as auscultation, plus a liberal assist from radiology and electrocardiography.

This book does serve well the purposes of the authors, and it is a noteworthy contribution to the cardiovascular literature. There is a place for it in every cardiac clinic and medical library.

—*RALPH C. PARKER, Jr., Capt. (MC) USN*

THE PLASMA PROTEINS IN PREGNANCY, A Clinical Interpretation, by *Harold C. Mack*, M. D. Foreword by *Nicholson J. Eastman*, M. D. American Lecture Series, Publication Number 252, A Monograph in American Lectures in Gynecology and Obstetrics, edited by *E. C. Hamblen*, B. S., M. D., F. A. C. S. 118 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $3.75.

This is a compact monograph covering a series of clinical and laboratory studies on human plasma proteins in pregnancy from the preconceptional state through postpartum readjustment. Use is made of the newer technic of electrophoresis for analysis and comparison of normal and pathologic changes in maternal and fetal physiology. The material presented includes the structure and functions of blood proteins, the plasma proteins in normal pregnancy, the plasma proteins in toxemia, and other disorders of pregnancy and fetal plasma proteins.

The author has attempted to correlate his findings with information he and his collaborators obtained by other methods, as well as with reports of other investigators. To this end, the literature has been extensively reviewed. The limitations of the various analytical procedures, including electrophoresis, are discussed. The author cautions against making generalizations on the basis of information presently

available, because of the multiple factors influencing protein metabolism in pregnancy. A comprehensive bibliography is appended, covering nutrition and nutritional deficiencies, electrolyte and water balance, blood, hemoglobin and plasma proteins, lipoproteins, antibody formation, sodium retention, kidney and liver function, and related subjects connected with protein metabolism in pregnancy.

This book will be of interest to practicing obstetricians generally, and of particular value for reference use by clinical investigators in the field.—*ARMAND J. PEREYRA, Capt. (MC) USN*

SEXUAL HYGIENE AND PATHOLOGY, by *John F. Oliven,* M. D. 481 pages. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $10.

As its preface states, this volume is "designed to fill the needs of practicing physicians, medical students, and certain groups of ancillary medical workers," and it appears to have fulfilled this intention well. The material is organized into four parts: sexuality in childhood, sexuality in the second decade, sexuality in the normal adult, and sexual pathology. The author gathered much of his material from physicians in general practice who kept records of sexual problems about which they were consulted medically and of information that they would have found helpful at those times. Therefore, we find discussed such diverse problems as those of domestic nudity, enemas, tomboyishness, pornography, petting, contraception, artificial defloration, et cetera, in addition to the usual standard subjects of discussion. Several sections of special interest deal with advice regarding sexual activity of patients with heart disease, obesity, pregnancy, orthopedic impairment, et cetera. The extensive treatment of the subject matter is exemplified by the definitive discussion of aphrodisiacs and anaphrodisiacs.

There is a mass of material covering practically every question any patient might raise in his family physician's consulting room or which the physician might be called upon to answer because of his position in the community. The text is happily not weighted down by footnotes, statistics, charts, tables, or other paraphernalia of the scientific treatise. There is enough theoretical discussion to make it more than a mere tabulation of various sex practices, normal and abnormal, and yet not so much as to make it a textbook of psychiatry or sexology. Only in the section on sexual deviations does the author seem overly concerned with the intricacies of the psychopathology involved. Because of the attempts to comment on all possible aspects of each deviation, this section could well prove confusing to the nonpsychiatric practitioner. Altogether this is a volume regarded as particularly useful to the general practitioner, but it would not be out of place on the bookshelf of the gynecologist, urologist, internist, or psychiatrist. It may be of value as well to the public health nurse and the social worker, provided it is used with proper medical supervision.

—*JAMES N. SUSSEX, Comdr. (MC) USN*

New Books Received

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be selected for review in a later issue.

PUBLIC HEALTH, Its Promise for the Future, A Chronicle of the Development of Public Health in the United States, 1604-1914, by *Wilson G. Smillie,* M. D., D. P. H., Sc. D. (Hon.) 501 pages; illustrated. The Macmillan Co., New York, N. Y., 1955.

NEW CONCEPTS IN SURGERY OF THE VASCULAR SYSTEM, by *Emile Holman,* M. D. American Lecture Series, Publication No. 271, A Monograph in American Lectures in Surgery, edited by *Michael E. De Bakey,* M. D. and *R. Glen Spurling,* M. D. 108 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $3.50.

OBSTETRICAL ANESTHESIA, Its Principles and Practice, by *Bert B. Hershenson,* M. D. With a Foreword by *Frederick C. Irving,* M. D. 403 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $9.50.

THE YEAR BOOK OF GENERAL SURGERY (1955-1956 Year Book Series), edited by *Evarts A. Graham,* M. D. With a Section on Anesthesia, edited by *Stuart C. Cullen,* M. D. 655 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1955. Price $6.

BASIC SURGICAL SKILLS, A Manual with Appropriate Exercises, by *Robert Tauber,* M. D., F. A. C. S. 75 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1955.

TEXTBOOK OF SURGERY, edited by *H. F. Moseley,* M. A., D. M., M. Ch. (Oxon), F. A. C. S., F. R. C. S. (Eng.), F. R. C. S. (C). With Foreword by *G. Gavin Miller,* M. D., C. M., M. Sc., F. R. C. S. (C), F. A. C. S. 2d edition. 1,136 pages; with 571 illustrations and 79 color plates. The C. V. Mosby Co., St. Louis, Mo., 1955. Price $16.50.

200 MILES UP, The Conquest of the Upper Air, by *J. Gordon Vaeth,* Head, New Weapons and Systems Division, U. S. Navy Special Devices Center, Office of Naval Research. 2d edition. 258 pages; illustrated. The Ronald Press Co., New York N. Y., 1955. Price $5.

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